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THE IRON TRADE REVIEW

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ENLIST IN THE NAVY

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Engineering Directory, pages 101-102. Classified Advertisements, pages 111-127.

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THE IRON TRADE REVIEW

Vol. LXI Cleveland, August 16, 1917 No. 7

Industry Faces Wide Federal Power

Proposed Senate Measure Would Place All Mill and Furnace Activities in Hands of Government—Steel Prices Reflect Uncertainty and Are Easier —Remarkable Fiscal Year in Exports

WHILE the iron and steel industry is carrying forward in its own way a readjustment to the new and unprecedented conditions which recently have developed, proposals for even more extraordinary government interference are looming before it. Through the Pomerene bill introduced in the senate the past week, the industry faces the most radical form of federal control yet concretely put forth. The enactment of this measure as originally drawn would place the production, sales and distribution of the industry completely in the hands of the government. The purpose of the bill apparently is to delegate to the government greater authority in connection with the approaching determination of production costs by the federal trade commission and such enforcement as is to be made of these findings. In connection with the complete government reports covering the most memorable fiscal year in the country's iron and steel trade, it is important to point out how extensive the export embargo, effective this week, really is. Out of 6,868,978 tons sent abroad in the 12 months ending with June, 3,008,576 tons were in plates, pig iron, scrap and semifinished steel, the products in which overseas shipment is forbidden.

Steel Prices Are Easier

Market conditions reflect the prevailing uncertainties among both buyers and sellers in their efforts to gage the various influences to which the industry is being subjected. In rolled products, a certain amount of easing up in the tension of prices, which long has held sway, is manifest. Re-selling activity has increased. Semifinished steel has continued to develop lower levels. Sales have been made at $15 or more below the recent maximum points. Wire rods are down. This decline brings semifinished steel more in line with its normal spread over pig iron values. That the export embargo has been an important factor in causing sellers to be less confident of their market, there is little doubt. The reduced tonnage called for by the automobile trade also is of importance. In the Pittsburgh district some re-selling by finishing mills has appeared. Even in plates, which have been probably the strongest finished line, lower offers have been made, some of which are of a re-sale character. In general, premiums are less obtainable for early delivery on finished steel. In some districts warehouse business has declined. The depressed state of the country's general building activity is displayed by the official report showing only 41½ per cent of fabricated shop capacity was contracted for in July. Some of the shops continue to re-sell surplus stocks of shapes which have grown as new business has dropped.

Navy Places Foundry Iron

The week in pig iron has been a repetition of the previous conditions of small inquiry, fewer sales and a strong demand for shipment. While there has been some re-selling as a result of the embargo on exports, this has not been extensive and prices have yielded little. Prices, in general, are well sustained, though sufficient business has not been done in some grades to afford a real test. The $27.50 furnace price, which has accompanied a purchase of 6000 tons of foundry iron by the navy department has come in for considerable discussion in the market. The contract figure is not a final one and is subject to change after the federal trade commission completes its determination of production costs and a reasonable profit. Orders for this iron have been distributed among a number of furnaces in the north and south. The navy department also has arranged for some tonnage of iron to go to manufacturers who are to fill orders for warship equipment.

Ore Delays Are Serious

Continued retarding of the dispatch of ore vessels at lower lake ports owing to insufficient car supply has grown more acute. As a result, some of the confident predictions that the fleet will be able to deliver the tonnage of ore set before it, as the season's goal and necessity, have been shaken.

The Iron Trade Review

EDITORIAL

Problems of a One Price Policy

INTERESTING and serious questions have been raised as the result of the officially-announced policy of the war industries board that the entente allies shall be allowed the same prices for material purchased in this country as are paid by this government. It is unfortunate that the board did not see fit to make clear all the points involved. Perhaps some of them are of such character that this is not possible at this time. It would seem, however, that it might have clarified the situation beyond what it has done. By not doing this the business interests continue to be left in a state of uncertainty with its resulting injury to industry.

When it is announced that the board proposes the same prices for the entente allies as for this government, the query naturally arises as to whether this policy is to be made applicable to orders already on the books, but not executed, or to new contracts for the present and future. Made retroactive, this policy would be extremely unfair and dangerous and would threaten the stability of many industries. To save many plants from serious embarrassment if not from disaster through heavy financial losses, reduction, by government action, of prices of raw material, already purchased, paid for and in many instances consumed would be necessary. This could not be done. It would, even as a physical undertaking, be impossible. Moreover, it would establish a precedent looking to an endless task. Finally, it would be unconstitutional, as well as most extraordinary, even under war conditions.

The success of the application of the one-price policy from this time, it is evident, depends upon the relief afforded manufacturers by the government in cutting down costs of production, though bringing about lower levels for raw materials. Inasmuch as the government apparently has no intention of cutting labor costs, it is obvious that allowance will have to be made by it for this factor in production outlay. The prices, therefore, both for this government and its allies, will have to be adjudicated accordingly. It will be interesting to observe the effect of the operation of this new policy. At present this government is getting war supplies at figures much lower than the market quotations or those applying to allied orders. With the latter reduced, will the prices for this government go up, the two meeting at an intermediary point? Or is it proposed that the prices now being paid by this government will continue in effect and also be extended to include allied purchases? This government already is paying prices, some of them only tentative, it is true, which are below manufacturing costs. That being so the necessity of lowering the costs becomes extremely apparent if the government is to avoid paralyzing industry.

These problems are most intricate and delicate, and, while the war industries board probably will not undertake to solve all of them at once, some of them could have been worked out and their significance made plain. The question as to whether the general public also will get materials at the same prices as those paid by the United States and its allies, the board stated, has not been determined. Despite the fact the inference was given that this would be done, further study of the issue, it is confidently believed, will convince the board that it is impossible of practical operation.

The Usual Wall Street Way

RUMORS, reports and half truths are part of the stock in trade of Wall street. They play their part, and a considerable one, in that much-vaunted district of finesse and devious dealing. Measured by its effects in dollars and cents, no important section of the business world gives them a higher rating or accepts them so readily at their face value. This appraisal, of course, is only a superficial manifestation of how the substantial interests in Wall street really feel. More often it simply is a reflection of an immediate condition of speculation.

Every now and then Wall street essays to pass its judgment according to its own standards upon some phase or development of the iron and steel industry. Such a demonstration was given during the past week when a report was spread broadcast that the government had fixed upon $27.50 as the price which it would pay for pig iron. This was a figure below the cost of production, so the report ran, and, therefore, revealed a most unfavorable state of affairs for the manufacturers. Arguing *a priori*, the whole iron and steel industry was to be unfairly dealt with. Iron and steel security values registered a severe swamp. Wall street forgot, or did not want to recall that only a few days before it had judged as gratifying the government announcement that its purchases would allow fair and reasonable profits to the iron and steel manufacturer. It overlooked the fact that iron and steel costs were in the process of determination by the federal trade commission and until these are fixed all prices for direct war purposes are to be regarded as purely tentative. It probably would be too much to expect Wall street to know that the government's direct

EDITORIAL

requirements of pig iron represent only a few thousand tons and are totally inconsequential as a market factor when considered against the many millions of tons of annual production; or that the prices mentioned in any other year but the present one would have been far above the open market; furthermore, since costs of production vary widely, general deductions based on the experiences of a few of the manufacturers, are apt to be misleading.

The truth happens to be that the government has bought several thousand tons of foundry iron to be split up among many producers; that a price of $27.50 does accompany the purchase, but only as an initial price which is subject to change depending upon the cost determination of the federal trade commission investigation: that the producers and the government are co-operating freely on a basis of mutual confidence in each other's fairness. Any way the proposition is looked at, there is no danger of the pig iron maker being forced to accept orders below cost. On the other hand, the government's fixing of costs is to include a reasonable profit over production charges.

All of which goes to show that as a medium for accurate dissemination and interpretation of iron and steel news, Wall street is about the last place in the world for the industry to go.

Dangers of Inactive Salesmanship

IS THE art and science of steel salesmanship to become lost or blunted through non-use? In the present situation this appears to be a live question and the answer seems to depend, like many other questions at present, on the uncertain duration of the war and resulting conditions.

At present the steel salesman is not selling. He has nothing to sell. His employer, who formerly commended him when an order was landed, now berates him when he has not been sufficiently adroit to sidestep effectively the importunities of a buyer. He is being retained on the payroll not to get business but to keep it away. His main function is to keep the inquiring consumer in good temper and at the same time avoid taking an order. He has been in this position for many months and to all appearances will continue to be so for a long time in the future. There seems to be real danger in this both for the individual salesman and for the business. The former is likely to become indolent under this inactivity. The fine edge of his skill may become blunted and his enthusiasm, which is of the first capital of salesmanship, may be lost. The older man tends in that direction naturally. The development of the younger man seems in danger of being stunted by prevailing conditions.

Many young men, chafing under their inactivity, are seeking other outlets for their abilities. This tends to break up the sales organizations of many companies. The effects of this situation probably will be felt for years to come and much effort will be required to bring back the old efficiency of sales organizations when it is needed.

One factor promises to lend some assistance in this restoration. It seems probable that the return to active selling efforts will be gradual. Salesmen likely will have opportunity to work back by degrees from their present inactivity to the usual hustle and keen effort. They will need some time to readjust themselves to the ways of normal business life.

War Breaks Down Age Limits

ANNOUNCEMENT by the Pennsylvania railroad of its intention to waive its rule of employing men not older than 45 years and for the period of the war, to accept for employment men up to 70 years indicates an innovation to meet present exigencies which doubtless will be adopted by many industries where similar policies are pursued. Like the employment of women laborers in shops, the positions thus opened by no means are assured as permanent. Needless to say the removal of the age restriction places the man over 45 on an equal basis pro tem with the more aggressive worker of 30, but if conditions again should return to a pre-war basis, employers will be less likely to overlook the shortcomings of the older man than they are at present when labor is unusually short. The mere fact that the announcement is made as a war expedient reveals a cautionary tendency on the part of the railroad against a time when labor again will become plentiful.

Many of these older men will be called upon to occupy the places vacated by those who have responded to the call of their country. Doubtless the war will claim many, others returning with changed aspects will seek new channels of employment; but as history repeats itself, the majority of those recruited into military service probably will return to their former jobs. With all justification, former positions should be restored to those who have enlisted should previously their qualifications for their positions have been fully established. Even should this policy be not adopted universally, the men over 45 will have to make good in the face of a keen competition and cannot view the new ruling otherwise than as a war measure from which they are to draw benefits for an uncertain period of time.

Iron and Steel Prices

Corrected to Wednesday Noon

SCRAP, WAREHOUSE AND IRON ORE PRICES ON PAGE 370

PIG IRON

(Delivery this year.)

Bessemer valley	$55.00
Bessemer, Pittsburgh	55.95
Basic, Pittsburgh	52.95
Basic, eastern Pa.	50.00 to 52.00
Basic, Buffalo	54.00 to 55.00
Malleable, Pittsburgh	55.95
Malleable foundry, Chicago.	55.00
Malleable foundry, Phila.	56.00 to 58.00
Malleable foundry, Buffalo.	54.00 to 55.00
No. 1X, Phila.	55.50 to 57.50
No. 2 foundry, Pittsburgh	55.95
No. 2 foundry, Cleveland	55.00
No. 2 foundry, Ironton	55.00
No. 1 foundry, Chicago	56.00
No. 2 foundry, Chicago	55.00
No. 2X foundry, Phila.	53.00 to 55.00
No. 2X foundry, N. J. tide.	53.00 to 55.00
No. 2X foundry, Buffalo	53.00 to 55.00
No. 2 plain, Philadelphia	52.50 to 54.50
No. 2 plain, N. J. tide	52.50 to 54.50
No. 2 plain, Buffalo	52.00 to 54.00
No. 2 southern, Birmingham.	46.00 to 48.00
No. 2 southern, Cincinnati	48.90 to 50.90
No. 2 southern, Chicago	50.00 to 54.00
No. 2 southern, Phila. del.	53.00 to 54.00
No. 2 southern, Cleveland	50.00 to 52.00
No. 2 southern, N. Y.	52.75 to 53.75
No. 2 southern, Boston	53.50 to 54.50
No. 2 south. interior, N. E.	54.00 to 55.00
No. 2 southern, St. Louis	49.40 to 51.40
Virginia, No. 2X, furnace	52.00 to 53.00
Virginia, No. 2X, Phila.	54.75 to 55.75
Virginia, No. 2X, Jersey City	55.00 to 56.00
Virginia, No. 2X, Boston	55.25 to 56.25
Gray forge, eastern Pa.	50.00
Gray forge, Pittsburgh	52.95 to 53.95
Gray forge, Birmingham	45.50 to 46.00
Silveries, 8 per cent, furnace	80.00 to 85.00
Silveries, 8 per cent, Chicago	85.00 to 92.50
Low phos. standard, Phila.	92.00 to 93.00
Low phos. Lebanon furnace.	83.00 to 85.00
Low phos., Pittsburgh	82.00 to 85.00
Charcoal, Superior, Chicago.	59.50 to 62.00
Charcoal, Superior, Buffalo.	55.00 to 60.00
Charcoal, Birmingham	55.00 to 60.00

COKE

(At the ovens.)

Connellsville furnace	$15.00 to 16.00
Connellsville furnace, contract	10.00
Connellsville foundry, contract	12.50
Connellsville foundry	12.50 to 14.00
Wise county furnace, contract	10.00 to 11.00
Wise county foundry, contract	11.50 to 12.00
Pocahontas furnace, contract.	10.50 to 11.00
New River foundry, contract.	13.00
New River furnace, contract.	8.50 to 10.00

FERRO ALLOYS

Ferromanganese, prompt	$400.00 to 415.00
Ferromanganese, last half.	**375.00 to 400.00**
Spiegeleisen, 20 per cent furnace remainder of year.	80.00 to 82.50
Ferrosilicon, 50 per cent, Pitts.	225.00
Ferrosilicon, 50 per cent, Pitts., 1st quarter	130.00 to 150.00
Bessemer ferrosilicon, 9 per cent.	$94.00
Bessemer ferrosilicon, 10 per cent.	95.00
Bessemer ferrosilicon, 11 per cent.	97.50
Bessemer ferrosilicon, 12 per cent.	100.00
Bessemer ferrosilicon, 13 per cent.	105.00

Ferrosilicon prices at Ashland, Ky., Jackson and New Straitsville, O., furnaces.

SEMI-FINISHED MATERIAL

BILLETS

Open hearth, Pittsburgh	$90.00
Open hearth, Philadelphia.	100.00 to 105.00
Open hearth, Youngstown.	90.00
Bessemer, Pittsburgh	100.00 to 105.00
Bessemer, Youngstown	90.00
Forging, Pittsburgh	125.00
Forging, Philadelphia	125.00 to 135.00
Forging, Chicago	**100.00**

SHEET BARS

Open hearth, Pittsburgh	$90.00
Open hearth, Youngstown.	90.00
Open hearth, Cleveland	**110.00**
Bessemer, Pittsburgh	90.00
Bessemer, Youngstown	90.00

WIRE RODS, MUCK BAR, SKELP

Wire rods, Pittsburgh	$90.00
Muck bar, Pittsburgh	85.00 to 90.00
Grooved skelp, Pitts., nom.	4.00c to 4.50c
Sheared skelp, Pitts., nom.	4.50c to 5.00c

SHAPES, PLATES AND BARS

Structural shapes, Pitts.	4.50c to 6.00c
Structural shapes, Phila.	4.659c to 5.159c
Structural shapes, N. Y.	4.669c to 5.169c
Structural shapes, Chicago.	4.94c to 6.19c
Tank plates, Chicago	10.19c
Tank plates, Pittsburgh	9.00c to 10.00c
Bars, soft steel, Pittsburgh.	4.00c to 5.00c
Tank plates, Philadelphia.	9.159c to 10.159c
Tank plates, New York.	9.169c to 10.169c
Bars, soft steel, Chicago.	4.50c
Bars, soft steel, New York	4.669c to 4.919c
Bars, soft steel, Phila.	4.659c to 4.909c
Cotton ties, Pitts., Aug.	$2.12
Bar iron, Chicago	4.50c to 5.00c
Bar iron, Philadelphia	4.909c
Bar Iron, Cleveland	4.50c to 5.00c
Bar iron, New York	4.919c
Bar iron, Pittsburgh	5.25c
Hard steel bars, Chicago.	4.25c to 4.50c

RAILS, TRACK MATERIAL

Angle bars, Pittsburgh, base	3.75c to 4.00c
Angle bars, Chicago, base.	3.25c to 4.00c
Standard bessemer rails, mill.	$38.00
Stand. open hearth rails, mill	40.00
Light rails, 25 to 45 lbs., Chic.	70.00
Light rails, 25 to 45 lbs., Pitts.	75.00 to 85.00
Relayers, standard, mill	38.00 to 40.00
Relayers, light, Chicago	60.00
Relaying rails, light, St. L.	57.00 to 59.00
Spikes, railroad, Pittsburgh.	6.50c to 7.00c
Spikes, railroad, Chicago	4.25c to 5.25c
Track bolts, Pittsburgh	5.50c to 8.00c
Track bolts, Chicago	5.25c to 6.50c
Tie plates, Chicago	$70.00 to 75.00

WIRE PRODUCTS

(Prices of independent makers.)

(To jobbers; retailers 5 cents more.)

Wire nails, Pittsburgh	$4.00
Coated nails, Pittsburgh	4.00
Plain wire, Pittsburgh	3.95
Galvanized wire, Pittsburgh	4.65
Polished staples, Pittsburgh	4.15
Galvanized staples, Pittsburgh.	4.85
Barb wire, painted, Pittsburgh.	4.15
Barb wire, galvanized, Pitts.	4.85
Cut nails, Pittsburgh	4.50

CHAIN, PILING, STRIP STEEL

Chain, ⅜ in. proof coil, Pitts. 9.00c

Sheet piling, base, Pittsburgh 4.00c to 5.00c

Cold rolled strip steel, hard coils, 1¼ inches and wider by 0.100 inch and heavier, base per 100 pounds, 9.00c to 9.50c.

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SHEETS

(In cents per pound.)

SHEET MILL BLACK.

No. 28, open hearth, Pitts.	9.00c to 9.50c
No. 28, bessemer, Pitts.	9.00c to 9.50c
No. 28, open hearth, Chic.	9.19c to 9.69c

TIN MILL, BLACK

No. 28, open hearth, Pitts.	9.00c to 9.50c
No. 28, bessemer, Pitts.	9.00c to 9.50c

GALVANIZED

No. 28, open hearth, Pitts.	10.25c to 11.50c
No. 28, bessemer, Pitts.	10.25c to 11.50c
No. 28, open hearth, Chic.	10.19c to 11.19c

BLUE ANNEALED

No. 10, open hearth, Pitts.	8.50c to 9.00c
No. 10, bessemer, Pitts.	8.50c to 9.00c
No. 10, open hearth, Chic.	8.94c to 9.19c
No. 10, open hearth, Phila.	8.659c to 8.909c

TIN PLATE

(Per 100 lb. box.)

Tin plate, coke base, nom. $10.00 to 15.00

IRON AND STEEL PIPE

(Prices adopted June 18, 1917.)

Steel

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 3, butt	42	28½

Iron.

(Prices adopted June 30, 1917.)

Diameter in inches.	Black. Per cent off.	Galv. Per cent off.
¼ to 1½, butt	33	17

BOILER TUBES

(Price adopted April 2, 1917.)

Steel, 3½ to 4½ inches, l. c. l.	34
Iron, 3½ to 4½ inches, l. c. l.	28

CAST IRON WATER PIPE

(Class B Pipe.)

Four-inch, Chicago	68.50
Six-inch and over, Chicago.	65.50
Four-inch, New York	68.50
Six-inch and over, New York	65.50
Four-inch, Birmingham	58.00
Six-in. and over, Birmingham	55.00

Class A pipe is $1 higher than Class B.

HOOPS, BANDS, SHAFTING

Hoops, Pittsburgh	6.00c to 6.50c
Bands, Pittsburgh	6.00c to 6.50c
Shafting, Pittsburgh, carloads	5 off to list

RIVETS

Structural rivets, Pittsburgh.	5.25c
Boiler rivets, Pittsburgh.	5.35c
Tinner's rivets, Pittsburgh.	40 off

NUTS AND BOLTS

(Delivered within 20-cent freight radius.)

CARRIAGE BOLTS

(⅜ x 6 inches, smaller and shorter.)

Rolled thread	40 off
Cut thread	35 and 2½ off
Larger or longer	25 off

MACHINE BOLTS

(⅜ x 4 inches, hot pressed nuts.)

Rolled thread	40 and 10 off
Cut thread	40
Larger and longer	30
Cold pressed, semi-finished, hexagon nuts	**50, 10 and 5**
Gimlet and cone point lag bolts	40 and 10

NUTS

Hot pressed, square, blank	1.10 off
Hot pressed, square, tapped	1.90 off
Cold pressed, square, blank	1.50 off
Cold pressed, square, tapped	1.25 off
Hot pressed, hexagon, blank	1.90 off
Hot pressed, hexagon, tapped	1.70 off
Cold pressed, hexagon, blank	1.50 off
Cold pressed, hexagon, tapped	1.25 off

Prices Present and Past

(Yesterday, a month ago, three months ago and a year ago.)

Quotations on leading products August 15, average for July, 1917, average for May, 1917, and average for August, 1916. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices Aug. 15, 1917.	Average prices July, 1917.	May, 1917.	July, 1916.
Bessemer pig iron, Pittsburgh..	$55.95	$57.95	$44.95	$21.95
Basic pig iron, Pittsburgh.....	52.95	53.20	42.15	18.95
No. 2 Foundry pig iron, Pitts..	55.95	55.95	43.55	19.45
No. 2 Foundry pig iron, Chic...	55.00	55.00	43.20	19.00
Lake Superior Charcoal, Chicago	59.50	59.50	49.25	19.75
Malleable, Chicago	55.00	55.00	43.20	19.50
Southern No. 2, Birmingham...	47.00	46.00	35.75	13.75
Southern Ohio No. 2, Ironton..	55.00	54.25	38.60	18.50
Basic, eastern Pa.....	51.00	50.75	40.75	19.25
No. 2X Virginia, furnace.....	52.50	52.25	41.00	18.50
No. 2X foundry, Philadelphia..	54.00	54.25	43.25	19.85
Ferro mang., delivered.....	400.00	430.00	425.00	170.00*
Bessemer billets, Pittsburgh....	90.00	100.00	85.00	43.50
Bessemer sheet bars, Pittsburgh	90.00	105.00	88.00	43.50
Open hearth sheet bars, Pitts..	90.00	105.00	88.00	43.50
Open hearth billets, Pittsburgh.	90.00	100.00	85.00	43.50
Steel bars, Pittsburgh.....	4.00	3.85	3.50	2.50
Steel bars, Chicago.....	4.50	4.50	3.49	2.79
Iron bars, Philadelphia.....	4.909	4.759	4.159	2.559
Iron bars, Cleveland, local del'y	5.00	4.50	3.25	2.40

*Seaboard.

	Prices Aug. 15, 1917.	Average prices July, 1917.	May, 1917.	July, 1916.
Iron bars, Chicago mill.....	$4.50	$4.50	$3.39	$2.35
Beams, Chicago	6.19	4.94	4.34	2.79
Beams, Pittsburgh contract.....	4.50	4.50	4.50	2.50
Beams, Philadelphia	4.909	4.909	4.659	2.699
Tank plates, Pittsburgh.....	9.00	5.65	4.50	2.90
Tank plates, Chicago.....	10.19	9.64	5.49	3.19
Tank plates, Philadelphia.....	10.159	10.159	8.159	3.909
Sheets, blk., No. 28, Pittsburgh	9.00	9.00	7.00	2.90
Sheets, blue anld., No. 10, Pitts.	8.50	8.50	6.65	3.00
Sheets, galv., No. 28, Pittsburgh	10.25	10.25	8.85	4.40
Wire nails, Pittsburgh.....	4.00	4.00	3.50	2.50
Connellsville fur. coke, contract.	10.00	9.65	8.00	2.45
Connellsville fdy. coke, contract.	12.50	12.40	8.50	3.15
Heavy melting steel, Pittsburgh	33.00	40.25	28.40	16.25
Heavy melting steel, eastern Pa.	31.50	37.00	26.00	15.00
Heavy melting steel, Chicago...	32.50	35.50	28.75	15.00
No. 1 wrought, eastern Pa.....	44.50	54.00	42.00	20.00
No. 1 wrought, Chicago.....	36.00	39.25	32.50	15.50
Rerolling rails, Chicago.....	39.50	46.25	36.75	15.75
Car wheels, Chicago.....	30.00	36.75	27.25	12.90

(For Additional Prices See Page 370)

Resale Iron Affects Market Little

Some Concessions Offered on Metal Blocked for Foreign Shipment by Embargo, But These Are Readily Absorbed—Navy Distributes Tonnage Among Various Producers—Drifting Market Still Prevails in All Sections

Philadelphia, Aug. 13.—The pig iron market seems to have weathered the first shock of the recently announced export license policy without material effect upon prices. There have been several resales of iron originally destined for export, but any price concessions have been slight. Furnace interests generally express relief that conditions have shaped themselves as to reduce even slightly the strain under which they have been in recent months. This feeling is the more prevalent because of the contraction in output caused by the hot weather, fuel and traffic situation. While there is a fairly heavy tonnage on furnace books for export to Japan and other countries, sellers say they can ship every pound they produce to domestic consumers who have been pressing for metal. The situation with regard to licenses continues very involved. Leading iron interests admit they are unable to fathom it, especially as various railroad and governmental agencies do not seem to be interpreting to the letter the ruling as it was recently set forth. A widespread desire has been evident on the part of exporting interests to get material moving before Aug. 15, when the embargo is effective. Several inquiries recently were in the market for iron for immediate shipment, one being for 1500 tons of bessemer, and another for 500 tons of low phosphorus. Domestic inquiry continues quiet, with uncertainty as to what the government may decide to do still the dominant market factor. The inquiry of a New Jersey consumer for 5000 to 7000 tons of basic for delivery over the remainder of the year still is pending. The market for basic continues nominally around $51, furnace. Northern foundry has been extremely dull. Sales of a few carloads of eastern Pennsylvania No. 2X are being made at around $53 to $55, Philadelphia. A sale of 6000 tons of No. 2X is reported to have been made yesterday for last quarter at $53, Philadelphia. A few more cars of Virginia No. 2X have been sold at $51, furnace, but the supply is extremely limited. Most sellers are holding around $52 to $52.50, furnace. Little activity is evident in southern iron. The traffic congestion in the south continues the main feature in that district. Southern No. 2 for this year generally is held at $48 to $50, Birmingham, and for the first half of next year $45 and $46 can be done.

Some Reselling

New York, Aug. 14.—The pig iron market is at a standstill. No new inquiries of consequence have appeared within the past week and several of those which had been pending have been withdrawn. Owing to the sold-up condition of furnaces, sellers are showing no inclination to make price concessions to obtain business, but are bending their efforts to speed up shipments. The few small sales are going at quoted market prices. Buyers and sellers alike are watching every move at Washington along the lines of attempted price regulation. As yet no policy has been settled upon, although several suggestions have been considered carefully by the pig iron committee. One of these proposals was that the government fix the cost of coke and ore to furnacemen, leaving them to arrange their own limestone and labor costs, and then establish a maximum price for pig iron. This scheme is considered faulty in that deliveries of coke at the proposed estab-

lished price are not assured, while the item of labor cost is an extremely uncertain element. Several reports have been circulating of reselling of iron at tidewater for which exporters had been unable to get licenses. One of these was to the effect that 10,000 tons of bessemer iron in New York had been sold at prices ranging from $52 down to $48.50. Such reselling as have been made has had little influence on furnace prices.

In the absence of transactions, the market is unchanged and nominal, with sellers generally quoting $53 to $55, furnace, on No. 2X, Buffalo, and the same range Philadelphia basis on eastern Pennsylvania No. 2X. The inquiry for 5000 tons of basic iron by a New Jersey consumer remains pending. A Rhode Island buyer has closed with a New York state maker for 1000 tons of malleable.

Valley Market Stagnant

Pittsburgh, Aug. 14.—The pig iron market, which has bordered on stagnation for several weeks, shows no signs of activity. Except for the sale of carload lots at prevailing prices, no tonnages have been turned over. Specifications against contracts are heavy and no iron is being piled by blast furnaces. This indicates that the melt is as heavy as ever and leads producers to believe that a buying movement will be enjoyed just as soon as conditions generally are more nearly normal. It is believed, however, that consumers will not enter the market for additional tonnages until federal officials have taken some definite action with reference to the adoption of prices for military necessities. Blast furnace managers are complaining about deferred shipments of coke. Bessemer, malleable and foundry grades continue to be held at $55, valley, and basic appears to be well pegged at $52, valley. Quotations, however, have not been severely tested. As far as can be learned, no resale tonnages are being offered in this district.

Government Order Distributed

Buffalo, Aug. 14.—A small government tonnage of foundry pig iron was distributed among makers in this district during the past week, at a price to be determined later. Outside of this, there has been very little iron of any grade bought and sold in the district. A recent sale of size was 4000 to 5000 tons of malleable to a local consumer. Producers call attention to the fact that there is a very persistent reduction of pig iron stocks and that there is a grave shortage developing. Only in the south, it is claimed, are there any sizeable stocks remaining, and this is due principally to the fact that it cannot be shipped out. With producers sold out and buyers awaiting developments, there is very little business except in carload and other small lots. These small lots command from $57 to $58 for 4 to 5 per cent silicon iron. One small lot of 2.25 to 2.75 silicon iron was sold at $54.50. Foundry grades, what little was disposed of and it appears to have been a small amount, commanded $55. About 100 tons of foundry of an eastern furnace with local connections was sold at $53, furnace, but it is understood that there is not very much more of this iron on the market. An inquiry for 500 tons of basic now is before the market. The basic iron situation is a little easier, although none seems to have been offered by the producers of this district. Some outside competition in this grade appears to be developing. A Canadian inquiry for 1000 tons of bessemer has been current.

Carloads are Only Sales

Cleveland, Aug. 14.—New selling of iron in this district has been limited to a few carloads and there is practically no inquiry. The dullness in new business, however, is completely out of line with the current consumptive conditions as indicated by the pressure exerted by users to get deliveries against old contracts. Foundry iron production in this district has been cut down by the blowing out for repairs of one of the River group. Some of the local consumers of foundry seem to be in greater difficulty to get supplies and have been seeking carloads in various directions. Some sales of this character are notel calling for valley No. 2 at $55, furnace, and No. 2X Virginia at $51, furnace, or $54.40, this district. There is no inquiry for steelmaking irons except one for 1000 tons of bessemer from outside this territory.

Coke Conditions Cause Trouble

Chicago, Aug. 15.—Under the expectation of possible price regulation at Washington, buyers of pig iron are disposed to wait developments. It seems unlikely that the present quotation of $55, furnace, will be exceeded and it is believed generally not much chance is being taken in waiting as any change from the present level probably would be downward. Inasmuch as makers in this district are sold almost completely to the middle of 1918, little possibility of further buying for delivery before that date exists. Makers welcome the present quietness as an opportunity to devote their energies to meeting heavy contract obligations. Irregularity of quality and scarcity of coke are rendering production increasingly difficult. This comes about from the coal and car situation. Almost all makers are behind on contracts and deliveries are much deferred, which results in considerable spot demand. Off iron finds a ready market among spot buyers and the coke situation produces more of this than usual. Melters find high silicon iron difficult to obtain and in some instances foundry mixtures are undergoing considerable change to meet this scarcity. Furnaces producing high silicon have difficulty in obtaining sufficient coke, which is reducing their output materially. Foundry operation is heavy and melters are using all the iron they can obtain. Frequent requests for anticipation shipments are being made. Under present circumstances this is difficult to obtain. Southern iron is quiet. Spot iron commands $50, Birmingham, but is obtainable only in small tonnages. Sales for first half of next year are understood to have been made at $48.50, Birmingham. Lake Superior charcoal has been sold for the first half of 1918 at $59.50 to $62, delivered Chicago. Comparatively little of this iron is available for this year.

More Inquiry, No Buying

Cincinnati, Aug. 13.—A slight improvement in the inquiry for future iron has not been followed by buying on the part of any of these prospective customers. Foundry iron consumers are sticking close to shore and are only covering for urgent requirements; as one dealer tersely puts it: "All buyers seem to have set their courses well within the 3-mile limit, and are not now venturing outside." Southern foundry iron is being sold in widely scattered lots for this year's shipment at from $48 to $50, Birmingham. Resale iron is a little more in evidence, but has not affected quotations. Most of the foundry business just now is from those concerns making machinery castings; the stove foundries appear to be supplied ahead as they are practically buying no iron of any kind. The failure of steelmakers in this territory to take any interest in the future is taken to indicate that their previous purchases were larger than reported at the time and that they are well supplied over the year and well along into 1918. Spiegeleisen is in better demand and 20 per cent is selling at $85 to $87. Northern foundry is quoted at $55 to $56, Ironton,

and a few cars lately were disposed of at the latter figure.

Little Reselling Shown

Birmingham, Ala., Aug. 14.—Pig iron manufacturers in the Birmingham district are receiving a number of small lot orders. One sale of high silicon iron was made at $53 during the past week and several small lots of special brand and analysis irons went at $51.50. Delivery is being pushed on contracts in hand for foundry and basic as consumers are vigorously urging shipments. Further reduction of stocks of iron on yards is noted. Much has been heard lately as to the reselling of lots of iron for export which has been piling up at ports awaiting ships. While it is true that much of this iron was purchased when prices were low, as for instance the British government now is getting basic bought last year at $14, it is not believed that much of the metal will be forced on the market. No apprehension is felt from that source. Prices are holding firm at $50 for No. 2 foundry, for this year, and $48 for next year. There is a little easier feeling in this section as to the probable government control of prices and needs. Indirectly, much iron now is being furnished the government in this section. Production in Alabama soon may undergo some disturbance by reason of the strike of coal miners, fixed for Aug. 20, which now appears inevitable.

Spot Coke Keeps Jumping

Unfavorable Labor Conditions Force Furnace Fuel Up to $16 —Car Supply Better Than Efficiency of Workmen

Pittsburgh, Aug. 14.—Connellsville blast furnace coke for spot shipment is commanding from $15 to $16, ovens, $2 higher than a week ago, or $5 to $6 above prices prevailing a fortnight ago. Labor conditions appear to be the main cause for the market's behavior. The Jones & Laughlin Steel Co., the Cambria Steel Co., the Wisconsin Steel Co., and several eastern blast furnaces have been figuring in the market, taking nearly all the fuel available for prompt delivery. Talk of $17 coke is heard. The car supply last week was 75 to 80 per cent, compared with 55 to 60 per cent the week before. The supply the first two days this week was about 90 per cent. Cokemakers have been unable to take advantage of the improved traffic situation on account of the unwillingness of coke oven employes to work. Foundry coke is selling at several dollars a ton less than the price on furnace fuel. Production of coke the week ending Aug. 9 was 335,073 tons, compared with 367,355 tons the week before, according to *The Connellsville Courier*.

Consumers Push Shipments

New York, Aug. 14.—Consumers of both furnace and foundry coke in eastern territory appear well covered on their nearby requirements and to have been little affected by the market's flurry. A few sales of prompt Connellsville foundry were made recently at $13.50 to $14, ovens. Consumers have been giving attention to getting in shipments and despite the traffic situation have succeeded fairly well. No shut-downs of plants in this territory or New England because of fuel shortage are reported although one or two southern furnaces have been obliged to bank. The embargo on coke in New England was lifted a short time ago, but as a large proportion of manufacturers in that district are working on government contracts, they have been able to receive shipments. The market on spot furnace coke continues to move sharply, sales recently being reported at as high as $14.50, ovens.

Contracts Are Not Wanted

Birmingham, Ala., Aug. 14.—Every ton of coke that can be made at present in Alabama is being sought and manufacturers say they could sell considerably more than they are producing. There is no desire among buyers for contracts and all attention is being given to tiding over the last 10 days of the month as the strike of the United Mine Workers of America in this district is scheduled for Aug. 20. The Alabama Coal Operators' Association has given notice through the press that it will not recognize the union and asks that all union members who want to quit to vacate their houses so that other men may occupy them. The union announces signing contracts with several of the smaller companies. The belief is at this date that the curtailment of coal production will not be as extensive as the union leaders are claiming it will be and that the strike will not be long lived. However, there is more or less apprehension as to coke production. With the exception of one or two companies, iron manufacturers in this district have not a great amount of coke on hand and cannot go beyond a week without new supplies. Coke prices show no changes. Furnace coke is quoted at from $6 to $8 and the foundry coke at from $10 to $12, ovens.

Spot Jump Not Shown

Cincinnati, Aug. 13.—The expected sweeping advances in spot coke have not materialized in this district. The cooler weather had something to do with this, but a spasmodic improvement in the car situation early last week was not without effect. The reverse is now true of the temporary relief in the car shortage, with a strong probability that before the present week ends cars will be scarcer than ever before. Such indications already have begun to show themselves. Pocahontas and Wise county furnace contract prices are at $10 to $11, ovens, and contract foundry coke ranges from $12.50 to $13.50, ovens. Spot foundry coke is bringing all the way from $14 to $15.50 per net ton. Connellsville prices for spot fuel are the same, but desirable contracts may be placed a little lower. No contracting is reported in either furnace or foundry grades.

Want Cost Figures Instanter

Cleveland, Aug. 15.—Connellsville coke producers have found the federal trade commission in earnest in its effort to secure accurate data upon coke production costs of this fuel. Last Saturday a telegram, composed of 569 words was received by all leading Connellsville coke producers from the federal trade commission in which request was made for extremely accurate detail costs of coke making and coking coal mining for the entire year 1916 and also for the individual month of June of this year. These figures are to be sent forward to Washington within three days and in some cases the commission asked that preliminary figures be wired to Washington in order to hasten evident compilations.

Orders Huge Equipment

The New York, New Haven & Hartford railroad has placed orders for five electric engines weighing 180 tons each and capable of drawing 12 laden passenger coaches 70 miles an hour, for service in the energized zones between New York and New Haven, Conn. Fifteen additional engines will be ordered. Three systems of electrical propulsion are represented in this type of an engine.

Spiegel Demand is Brisk

Inquiries Total 10,000 Tons—Ferromanganese Tonnage Sells at $300—Manganese Ore Situation Uncertain

New York, Aug. 14.—Active inquiry for spiegeleisen continues and sellers report sales probably of 10,000 tons have come to their attention in the past few days. The Whitaker-Glessner Co., Portsmouth, O., has closed for the 3500 tons of spiegeleisen, obtaining part of this metal on a basis of $79, furnace and part at $80, furnace. The advice of the alloys committee to steel makers that they substitute spiegeleisen for ferromanganese wherever possible, apparently is being followed by various consumers.

Inquiry for ferromanganese continues rather light and made up largely of small requests. There have been some rumors of the material for nearby delivery being sold on the basis of $375, delivered, but this cannot be confirmed and the market seems steady at $400 for prompt, $375 for last quarter and $350 for delivery during the first half of 1918. A sale of 200 tons for the first quarter of 1918 was made at $350. Buyers of ferromanganese are confronted with two contrasting factors, which leave them in doubt as to the outlook in the market. One of these is the attitude of the alloys committee, and the possibility that the ferromanganese situation may be relieved by a larger consumption of spiegeleisen. On the other hand, the manganese ore situation seems to be more strained than usual. Not only is there a shortage of bottoms for transportation of Brazilian ore, but conditions in that country are not what might be desired. Brazil has a car shortage and the supply of mine labor is said to be inadequate. One buyer of manganese ore reports that a vessel recently arriving at Rio Janeiro was compelled to wait in the harbor for ore because of the lack of cars, the government having taken rolling stock for what it considers more essential purposes. Manganese ore now is held on the basis of about $1.20 per unit, the previous minimum of $1.15 practically having disappeared.

Some sellers of ferrosilicon are now making contracts for the calendar year 1918. Quotations are $145 and $150 on contracts of less than 1000 tons, and $135 to $145 on larger amounts. The price on prompt ferrosilicon ranges from $225 to $250, Pittsburgh. The wide gap between prompt and future prices is explained on the ground that makers must go into the market and cover on high priced raw material to make up orders not contracted for in advance.

Some fair-sized export sales of ferrovanadium were made recently at $3.25 per pound. Little activity is reported in ferrotungsten; 70 per cent alloy is quoted $2.25 to $2.50 per pound; a few sales were made recently at about $2.40.

Sales Are in Small Lots

Pittsburgh, Aug. 14.—A domestic manufacturer of ferromanganese has just sold several small lots at $420 to $430, delivered, although consumers say this material still is available at $400. Several tentative inquiries are pending, but negotiations involve no large single blocks. Spiegeleisen continues to be held at $80 to $85. A local consumer has closed for a carload of bessemer ferro-silicon on the basis of $95, furnace, for 10 per cent. Interest is shown by dealers as to the outcome of the proposal of the war industries board that the allies grant the same prices on materials which they export to this country as is paid by them for their own requirements.

Buys Ferro Tonnage

Cleveland, Aug. 14.—A leading consumer in Cleveland territory has closed for 2000 to 2500 tons of ferromanganese for shipment over the first quarter of next year at $350 delivered. An inquiry for 3500 tons of spiegeleisen for a Portsmouth, O., steelmaker which recently has been current, has been closed.

Chicago Ferro is Firm

Chicago, Aug. 15.—Ferromanganese from the Chicago maker is steady at $400 for prompt, $375 for fourth quarter, and $350 for first quarter of next year. Only a small tonnage is available for the remainder of this year.

Semifinished Works Lower

Sheet Bar and Slab Sales Reported at $90—Some Reselling Being Done—Forging Steel Brings $125

Philadelphia, Aug. 13.—Demand for semi-finished steel continues comparatively light, but offerings on the market appear scarce. The few sales which have been recorded in the past week indicate that prices are holding at former market levels. A lot of 2000 tons of forging billets was sold to a domestic consumer at $125, Philadelphia. Some export inquiries are in the market for this description, but little is being done, pending further information concerning the government export license policy. A sale of 5000 tons small rerolling billets has just been made to Italy, at $110, Pittsburgh. No negotiations are reported in sheet bars, slabs or other descriptions of semi-finished steel.

Special Steel Demand Active

Cleveland, Aug. 14.—Producers of electric and alloy steels are having difficulty to meet the demand which continues very active. Some inquiries of considerable size which have been current recently still are open as the buyers have not been able to induce producers to take on this tonnage. Orders for special steel for aeroplane engines and parts are more numerous. An easier condition in soft semifinished steel generally is apparent but the extent of this has not been made clear in this district in the absence of any transactions. One inquiry for 2000 tons of slabs has been current.

Billets and Sheet Bars Irregular

Pittsburgh, Aug. 14.—Prices of billets and sheet bars are from $10 to $15 per ton lower than a week or two ago. This is due in part undoubtedly to the tight export embargo on billets and also the decreased output of finishing mills, many of which have been operating at only about 60 per cent of theoretical capacity for 30 days or longer, on account of the hot weather. Another element is the retirement by makers of expensive automobiles from the market. Manufacturers of the more popular cars, however, continue to figure in the market actively. New steel capacity being completed also is a factor. Bessemer and open-hearth sheet bars recently have been offered at $90 and tonnages have been sold at that figure. A lot of 5000 tons of slabs were bought at $90, mill, a week or 10 days ago. Prices of billets range from $88 to $90, mill. The market for wire rods is easier. Tonnages are available at as low as $90, Pittsburgh, at which figure several small lots have been sold recently, compared with the recent quotations of from $100 to $105. High carbon steel rods are selling for from $110 to $115, Pitts-

burgh. The market for muck bar is unchanged.

Want Strip for Aeroplanes

Pittsburgh, Aug. 14.—Manufacturers of cold rolled strip steel have been called upon for material for shipment to aeroplane builders in various sections of the country. The domestic market continues quiet. This material is being held at 9c to 9.50c, base.

Government Buys Cars

Closes for 10,000 for Use in France—Big Locomotive Order—75,000 Kegs of Spikes Placed

New York, Aug. 14.—Purchase of railway equipment seems confined almost entirely to the government's requirements. These requirements, however, are on a broad scale. The government has distributed orders for 750 locomotives, of which 380 were taken by the Baldwin Locomotive Works. This is in addition to the recent French and Russian business and brings the total of orders on locomotive builder's books to a point where they will be busy for the next 12 months almost solely on work for the United States government and our allies.

Although there had been negotiations for steel rails by eastern railroads for 1918 and 1919 delivery, these continue to be held in abeyance. The recent government order for 150,000 tons for use on its mines in France will interfere with existing contracts to an extent that other deliveries will be pushed back about four months. The government on Monday distributed orders for 4000 four-wheel, flat-bottom, low-side gondolas in addition to 6000 eight-wheel cars distributed last week for use in France. No action has yet been taken on government's inquiry for several hundred artillery trucks, nor upon the French inquiry for 17,000 four-wheel gondolas reported several weeks ago to have been current.

Government Buys Cars

Chicago, Aug. 14.—The United States government has placed orders for 6000 freight cars, including tanks, gondolas, box, flat and refrigerator cars. These are for use on the railroad to be built in France by this government, connecting a seaport with the military front. They have been divided among the Pullman Co., the American Car & Foundry Co., the Standard Steel Car Co., the Haskell & Barker Car Co., and the Pressed Steel Car Co., in almost equal numbers. The steel necessary for this equipment, totaling about 50,000 tons, will be furnished largely by the leading interest.

An order for 75,000 kegs of railroad spikes was distributed recently, the leading independent receiving about 10 per cent and others in the usual proportion. It is understood these were furnished at 4.50c, Chicago, although the present market for spikes is considered 5.25c, Chicago. Of the 90,000 tons of rails which the Steel Corp. will supply as its portion of the 150,000-ton government order for shipment to France, it is understood 40,000 tons will be rolled by the local maker. Open-hearth rails probably will be furnished.

The M. S. Wright Co., Worcester, Mass., maker of vacuum cleaners, and the Pneuvac Co., Boston, the selling company of the former, have consolidated and the headquarters of the Pneuvac Co. will be transferred to Worcester. Morris S. Wright will have charge of the manufacturing department and C. J. Gleason the sales department.

War Takes Many Plates

Some Eastern Makers Devote 85 to 90 Per Cent of Output to War Needs—Big Tonnage for Cars

Philadelphia, Aug. 13.—Some plate mills are operating from 85 to 90 per cent on work intended directly or indirectly for the government. The pressure for plates from all directions is unabated. Some mills received inquiries for from 10,000 to 20,000 tons of plates for export in the past week but declined the business, being unable to promise reasonable shipment. The best promise of delivery obtainable is from 10 to 12 months, with the provision that government requirements do not interfere. The mills continue to arrange their rolling programs in accordance with instructions received from Washington. The Baldwin Locomotive Works has received an additional order for 380 locomotives, understood to be part of a total distribution of 750 just made in addition to the schedule already published for Russia and France. A tremendous tonnage of steel plates is before the market to cover approaching requirements for merchant ships provided in the government's program. The government is understood to be furnishing the steel for all ships of 2500 tons and over. The minimum price on tank plates is about 10.159c and on ship plates about 12c, Pittsburgh.

Big Tonnage for Government Cars

Pittsburgh, Aug. 14.—From 100,000 to 125,000 tons of steel will be required for the 10,000 freight cars just purchased by the government for use behind the American front in France. The Pressed Steel Car Co. will build 1200 of the 6000 standard cars ordered. The Emergency Fleet Corp. has not distributed any additional tonnages for plates, but it is likely that huge quantities of steel soon will be purchased to carry out the proposed shipbuilding program.

Offer Early Plates Lower

Cleveland, Aug. 14.—Offerings of plates for early shipment have been heavier and some of these have been at prices under those which recently have prevailed. On a lot of 500 tons of sheared plates originally sold for export, 8.50c, Pittsburgh, was named. There have been offers of universal plates for quick shipment at 8.50c, Pittsburgh. Some users have been offering to resell fair-sized lots around 8.50c. A car builder in western Pennsylvania placed 500 tons of car material principally plates.

Foreigners Want Tonnage

Youngstown, O., Aug. 14.—The demand for plates for export purposes has been extremely heavy within the past week. Makers attribute this to the license ruling effective Aug. 15. So eager were foreign buyers for material that 8c, mill, was paid for an unassorted lot cut from defective stock to the nearest marketable size. Foreign contracts made by one of the leading platemakers have been completed. Future inquiries for foreign delivery are being considered. However, they are subjected to cancellation provided permits for shipment are refused. Great Britain is inquiring for several thousand tons of various shaped plates for railroad work. The Navy department also is in the market for ship plates and specifies that a cost price be quoted so that a 10 per cent profit can be added.

Place Army Wagon Steel

Mills Receive Orders for More Bar Tonnage for Various War Purposes—Implement Manufacturers Still Inquiring

Chicago, Aug. 14.—About 3500 tons of steel has been placed for 10,000 transport wagons for the army, consisting chiefly of bars, with some plates and angles. Much of this material will be furnished on contracts already made by wagon builders. Comparatively little business is being done in bars, soft steel being almost unobtainable while hard steel and iron are not being booked by makers except in a small way. The export embargo does not cover bars and consequently this development has not affected the market. There is comparatively little inquiry except small feelers for delivery during the first half of next year, on the part of agricultural implement makers, which are not being quoted on. Iron bars are steady at a minimum of 4.50c, Chicago, and on some sizes 4.60c to 4.75c, Chicago has been done. Mills are already well sold for the remainder of this year. Hard steel bars are quoted generally at 4.50c to 5c, Chicago, although one maker is still booking some tonnage at 4.25c. Most inquiry now is for fourth quarter of this year and first quarter of next.

Japan Buys Bars

Philadelphia, Aug. 13.—A sale of about 1000 tons of steel bars for export to Japan was made last week at 5c, Pittsburgh. Several other export inquiries have been in the market, this class of material not being affected by the recent export license ruling. Little new domestic business is reported. The prevailing quotation for domestic tonnage is 4.50c, Pittsburgh. There have been few developments in the market for iron bars, quotations on desirable business being about 4.75c, Pittsburgh, while the general quotation is 5c; in some instances 5.25c is asked.

Bar Steel Enters Shells

Pittsburgh, Aug. 14.—Munition makers are calling upon manufacturers of rounds for heavy tonnages, although no definite information is being offered about the extent of these purchases. It is known, however, that barmakers are diverting a large portion of their output to the munition trade. Agricultural implement makers are specifying briskly. On the other hand, many builders of automobiles costing more than $1000 virtually have withdrawn from the market. The Ford Motor Co. continues to be an active buyer; the company, it is reported, is making 3300 cars a day, which is at the rate of 1,000,000 cars per year.

Truck Builders Buying

Cleveland, Aug. 14. — Implement makers continue to sound out the market for contracts for steel bars for the first half of next year, but the mills are not disposed to enter into such commitments at present. Truck builders in this district have been placing some further lots for war orders, some of which are for the French government. Additional orders for a large number of consort wagons for the army have been placed. A lot of about 1000 tons of tire steel for such purposes remains pending in this district. Reinforcing bars are easier. It is reported that a desirable tonnage could be placed at considerable concessions under prices recently prevailing. Some makers, however, who have large order books still are quoting 4.25c, mill.

Reinforcing Bars Placed

Buffalo, Aug. 14.—Some lots of steel for reinforcing bars are being placed in this district. For the Galveston, Tex., causeway, 2700 tons of reinforcing bars have been closed with the Jones & Laughlin Steel Co. by Larkin & Sangster, Buffalo, general contractors. An addition to the plant of F. N. Burt Co., Buffalo, will require 200 tons of reinforcing bars.

Buy Shafting for Fuses

Pittsburgh, Aug. 14.—Large quantities of cold rolled steel shafting continue to be purchased for the manufacture of munitions. Some makers now are diverting fully 40 per cent of their output to the manufacture of military necessities. This product is being quoted at 5 per cent off the list to list for carloads.

Hoops and Bands Quiet

Pittsburgh, Aug. 14.—The market for hoops and bands shows no signs of activity. Virtually all makers have withdrawn from the market for delivery the remainder of the year. Both products are commanding from 6c to 6.50c.

Rivetmakers Swamped

Pittsburgh, Aug. 14.—Manufacturers of nuts, bolts and rivets daily are receiving scores of inquiries for delivery to shipbuilders along the Atlantic seaboard and the Great Lakes. Premium prices frequently are being paid for prompt shipment. The emergency fleet corporation likely will dominate the market as soon as it commences to carry out its proposed program.

Liberal Cut

Made to Government by Cast Pipe Makers—Tonnage for Gas Line

New York, Aug. 14.—Excepting for work in connection with governmental projects, such as cantonments and camps, the cast iron pipe market is at a standstill. Makers are busy filling orders distributed some time ago, and will have plenty of government work for the next few months. The cast iron pipe makers have a central office in Washington representing all plants, and governmental business is distributed to the various companies through this medium. Contracts are being placed on the basis of $59 to northern foundries and $55 to southern foundries, or at least $5 under the open market. Practically no public work is being pushed and no inquiries reported. Neither have any contracts of any consequence been awarded in the past week. The general market for cast iron pipe is unchanged at $65.50, New York, for 6-inch, class B, and $68.50 for 4-inch, class B.

Pipe Mills Busy

Pittsburgh, Aug. 14.—Heavy consumers of pipe are coming into the market for delivery next year. Mills are well filled and are not accepting orders or are withholding new business, awaiting requirements of the government. A Pittsburgh gas company has put out an inquiry for 6600 tons of 1 to 12-inch iron and steel pipe. Prices remain unchanged.

Oil Prices Stimulate Inquiry

Youngstown, O., Aug. 14.—Inquiry for pipe has been particularly active during the past week. The high prices offered for crude oil has led operators to sink more wells. This has stimulated the pipe market to such an extent that mills are rushed with orders for lapwelded pipe.

Take Orders For Camps

Birmingham, Ala., Aug. 14.—Cast iron pipe plants in the Birmingham district have received rush orders from the government, for use in the cantonments in southern territory. This business, however, is not very extensive. There is considerable domes-

tic business coming in also despite the extremely high prices prevailing. Further accumulation of pipe at the plants of the United States Cast Iron Pipe & Foundry Co. on the Argentina order is noted, transportation facilities being inadequate. Foundries and machine shops in this district are working to maximum capacity.

Cast Pipe Dull

Chicago, Aug. 14.—With government requirements overshadowing the cast iron pipe market, other users seem to have retired almost entirely. The American Cast Iron Pipe Co. has taken 350 tons at Whitefish Bay, Wis., a suburb of Milwaukee. At present pipe makers are being kept busy providing specials for use with pipe bought for cantonment work. While this does not make a large tonnage, it is wanted promptly and means that makers must extend themselves to fill this demand.

Heavy Sale

Of Tin Plate for Export Made at $15 —Higher Offered

Pittsburgh, Aug. 14.—Attractive premiums are being offered by buyers for additional tin plate tonnages for shipment this year. A mill in the Greater Pittsburgh district has taken an order during the past few days for 100,000 boxes of tin plate for export at a figure said to be $15, base. As high as $17 and $18 per base box has been offered freely by exporters and rather large blocks at $17.50, base, have been sold. Demand continues to be heavy. Material reduction in the output of both sheets and tin plate in all sections of the country has been brought about by the hot weather. Many mills have not been operating at more than 60 per cent of their theoretical capacity since July 1. Production during the last week or 10 days, however, has been somewhat heavier than previously.

Plans Steel Foundry

The Massillon Steel Casting Co., Massillon, O., recently incorporated, advises, through A. H. Anthony, general manager, that the company will erect a new foundry for the production of small steel castings.

The Troy Engine & Machine Co., Troy, Pa., through A. R. McMahon, advises that the company is completing a new foundry addition and that provision has been made for all new equipment needed.

War Sheet Needs Expand

Estimated 150,000 Tons Will Be Required by End of Year —Lower Steel May Bring Price Change

Youngstown, O., Aug. 14.—The sheet market in the Mahoning valley remains in a sold-up condition and there is little new business being accepted. Although no lower sales of sheet bars are reported in this district, consumers expect to be able to buy their next lots at better advantage. This may lead to lower sheet prices in the opinion of some makers. A small allotment of blue annealed was sold at an advanced price of 9.25c. Black sheets are quoted at 9c to 9.25c and galvanized at 10.25c to 11.50c. Railroad conditions are unchanged.

Delivery Pressure Slackens

Philadelphia, Aug. 13.—Most consumers of blue annealed sheets in this territory are fairly well covered for their nearby requirements and except for a slight slackening in the pressure for deliveries the situation shows little change. Sheet makers are being called upon to supply increasing quantities of material for government work, some of the most recent work being in connection with the new order for 380 locomotives placed with the Baldwin Locomotive Works. The market for blue annealed sheets is quoted about 8.75c, Pittsburgh, by makers in this territory.

Government Dominates Sheet Market

Pittsburgh, Aug. 14.—Estimates continue to be made that approximately 150,000 tons of material for the government before the end of the year will be rolled by sheet manufacturers in this country. Tonnages reaching a large total are represented by orders being placed with sheet makers by the government. From 10 to 15 per cent of their capacity is being devoted by most mills to the direct and indirect requirements of the nation. These tonnages are to be used for camp ranges, stoves, buoys, shrapnel cases, steel cars and ships. Delay in production has been brought about by the policy of the government in deferring specifications. Price conditions are unchanged.

Strong Demand Continues

Chicago, Aug. 14.—Demand for steel sheets continues strong with quotations unchanged. On No. 28 gage black, the minimum appears to be 9.19c, Chicago, and on No. 10 gage blue annealed 8.94c, Chicago. No. 28 gage galvanized is steady at 10.19c, Chicago. A large eastern steel mill signalized the opening of its sheet department last week by taking a moderate tonnage in this territory.

Stock Orders

For Steel Being Placed by Government —Warehouse Trade Not So Active

New York, Aug. 14.—Warehouse prices on steel plates still compare favorably with mill prices, although the past week has seen an advance of $20 a ton from store in this territory. Plates now range from 8c to 10c, New York warehouse. The government work continues to take considerable material. The navy yards, arsenals and other government works are handling this buying locally, as there is no special government representative in charge of this purchasing. Aside from plates, prices have changed little. The demand remains active. Current quotations are as follows: Shapes, 5c to 5.25c; steel bars and small shapes, 4.75c to 5c; iron bars, 5c; reinforcing bars, 5.10c; No. 10 gage blue annealed sheets, 10c; No. 28 gage black sheets, 10c; No. 28 gage galvanized, 12c.

New Business is Lighter

Cleveland, Aug. 14.—New demand for steel from warehouse is not so active at present and in some lines an easier price condition is manifest. Offerings of steel bars at 4.50c, which has been the minimum figure, have been more numerous. Reinforcing bars also have been easier to obtain at more favorable terms to buyers.

Wide Spread on Plates

Chicago, Aug. 14.—Considerable irregularity exists in warehouse quotations on steel plates. One store closely connected with a steel producer continues to quote this material at 7c, store, while other stores have advanced to 10c, Chicago store. Demand for plates has been such that only regular customers can obtain this material as assortments are much broken. No change has been made on shapes and bars from store, the former being quoted at 5c and the latter at 4.50c, Chicago.

London has heard that Mexico has completed arrangements for a loan from the United States.

New Work Still Slumps

July Structural Awards Show Only 41½ Per Cent of Capacity —Armor Plate Bids to Come Soon

Washington, Aug. 14.—(By Wire).—Secretary Daniels today declared the navy department is going ahead with plans to build the armor plate plant at Charleston, reiterating his statement of Aug. 1. He also said his previous statement about abandoning the armor plate program until after the war was a misinterpretation of his declaration that, owing to the fact the plant could not be completed before the end of the war and it would of necessity, progress slower than the projectile plant that the latter would be pushed ahead of it. Some equipment has been purchased, some contracts for other equipment have been approved and still more equipment has been advertised. Working plans and specifications are being drawn despite rumors to the contrary. It is estimated as previously stated that 25,000 tons of structural steel will be required for the armor plate plant.

New York, Aug. 15.—Continual slump in general building operations requiring structural steel is shown by statistics of awards of the Bridge Builders and Structural Society for July. These reveal that only 41½ per cent of the fabricated shop capacity of the country or 74,400 tons was contracted for during the month.

The report of the society for a period of months showing percentages of capacity and approximate tonnage booked is as follows:

Month	Per cent	Approx. tonnage
July, 1917	41½	74,400
June	47½	85,500
May	56½	102,000
April	61	110,000
March	68	122,000
February	59	106,000
January	61½	119,000
December, 1916	86	148,000
November	78	134,000
October	77	133,500
September	52½	99,400
August	64	112,600
July	47½	83,600
June	58	100,000
May	80	137,000

Excepting shipbuilding and other work directly or indirectly connected with the war, new construction is practically at a standstill. Less new building is being undertaken in metropolitan territory at present, than in any time within the recollection of fabricators and structural steel men. Some sellers of structural shapes have not received an inquiry of consequence for six weeks. Fourteen fabricators recently competed for a small job at Newark, N. J., in which the steel amounted to only 70 tons. Such contracts as are accepted, are subject to interference of government work and fabricators cannot promise deliveries within 8 to 10 months. The Federal Shipbuilding Co. is understood to have awarded contracts for piling and dredging for its new yard on Newark bay. The American Bridge Co. will fabricate steel for buildings and craneways.

There is fair export inquiry for shapes. Prices range from 4.25c to 4.50c, Pittsburgh, for delivery at mills' convenience, with the maximum more widely quoted.

Concentrate on Ship Work

Philadelphia, Aug. 13.—Structural steel interests have been concentrating their efforts in producing plates and shapes for the rapid building of 34 mine sweepers for the government. Distribution is expected shortly of a large amount of steel for merchant ship construction. In some quarters it is estimated that there is so much of this work coming that it would take five to seven months of capacity operations on the part of all structural mills to complete the work. This work, of course, will be spread out over a much longer period of time. But mills are not promising any definite deliveries to fabricators and fabricators in turn are not making any promises to contractors. There is little doing in ordinary construction lines, although fabricators say they could obtain plenty of business from certain classes of consumers, whose ventures would be more or less speculative, such as the construction of storage facilities or of plant additions. But there is little demand of the nature of building for permanent investment. Contracts for structural steel for the Philadelphia subway have not been formally awarded, but it is generally understood to have been agreed upon that McClintic-Marshall Construction Co., Pittsburgh, will obtain about 15,000 tons and the American Bridge Co. about 6000 or 7000 tons. The Jones & Laughlin Steel Co. is low bidder on about 500 tons of steel for coast fortification work for the government. Structural steel prices show little change, remaining strong. Some warehouses have paid 5c and above for shapes. Beams are quoted 4.659c to 5.159c, Philadelphia.

Government Tonnage is Huge

Pittsburgh, Aug. 14.—Although exact figures are not available, it is conservatively estimated that rolling mills in the Greater Pittsburgh district have received orders directly or indirectly from the government for 500,000 tons of steel in one form or another. One mill manager says he believes 80 to 90 per cent of the output of rolling and finishing mills will enter the manufacture of munitions before Jan. 1, next. Fabricators are being called upon for tremendous tonnages for delivery to shipyards, cantonments and for aviation training camps. The domestic market, however, borders on stagnation. Prices have not been tested.

Turnbuckles are Advanced

Buffalo, Aug. 14.—The leading manufacturer of turnbuckles has advanced prices 10 to 20 per cent on a new classification recently put into effect. This classification makes separate listings of turnbuckles with stubs 1 inch and under; of 1⅛ inch to 1⅜ inch; of 1½ inch to 1⅞ inch; and of 2 inches and upwards. The same classification applies to buckles without stubs which is a departure from former lists. All inquiries for turnbuckles, furthermore, are to be submitted to the mill before acceptance. One of the contributing causes for the price advance is the expected heavy demand from the government for use in cantonments and aviation field buildings requiring heavy trussed roofs. One interest of this district is understood to be offering for fourth quarter delivery to regular customers bars and structurals at 4.25c and plates at 8c, Pittsburgh.

Shops Resell Material

Cleveland, Aug. 14.—Some of the fabricating shops which because of the dull conditions surrounding new work, find they have more structural steel on mill contracts than they can use, are offering this material for resale. New inquiry for structural material is extremely light. Eastern makers who frequently sell shapes in this territory, are able to offer little at present on account of the tonnage they are directing to government needs.

More Activity in West

Chicago, Aug. 14.—Somewhat more active conditions prevail in the structural market in the west, due entirely to lettings by railroads and public utilities. Industrial construction and commercial building seem to be entirely out of the running at present. The largest project involves about 700 tons for a telephone exchange building in Oakland, Cal. Other tonnages are small. On plain material no open quotations seem to exist, due to lack of interest by buyers, but

4.75c, Chicago, apparently is the minimum.

CONTRACTS AWARDED.

Buildings for the Northwestern Ordnance Co., Madison, Wis., 600 tons to the Worden-Allen Co.

Buildings for the Wisconsin Gun Co., Milwaukee, 600 tons, to the Worden-Allen Co.

Engine and boiler house, and shop additions for the Charcoal Iron Co. of America, Bessemer, Mich., 400 tons, to the Worden-Allen Company.

Plant and office building for the Curtis Engineering Corp. at Garden City, L. I., general contract to John W. Cowper Co., Buffalo, and steel work to Ferguson Steel & Iron Co.

Causeway, Galveston, Tex., 2700 tons reinforcing bars placed by general contractors Larkin & Sangster, Buffalo, to the Jones & Laughlin Co., Pittsburgh.

Deck plate girder spans for Minneapolis, St. Paul & Sault Ste. Marie Railroad Co., Spokane, Wash., 125 tons, to Minneapolis Steel & Machinery Co.

Addition to Fisk street station for Commonwealth-Edison Co., Chicago, 240 tons, to Hansell-Elcock Co.

One 156-foot S. T. through riveted truss span for Missouri Pacific Railroad Co., Sweet Springs, Mo., 180 tons, to American Bridge Company.

Office building for the Pacific Telephone & Telegraph Co., Oakland, Cal., 708 tons, to California Steel Co.

CONTRACTS PENDING.

Three buildings for Willys-Morrow Co., Elmira, N. Y., 500 tons, bids being taken.

Plant addition for Stanley Works, New Britain, Conn., 300 tons, bids being taken.

Power house for Beacon Light & Power Co., Philadelphia, 4500 tons, bids being taken.

Plant addition for F. N. Burt & Co., Buffalo, 200 tons reinforcing bars and some structural steel. Bids being taken.

Scrap Has Stronger Tone

Heavy Melting Steel Sells at $4 Above Low Point at Pittsburgh —Partial Improvement in Other Districts

Pittsburgh, Aug. 14.—The scrap market, which has been dull and inactive for many weeks, is showing a few definite signs of strength. Heavy melting steel is reported to have been sold at $36, delivered, or $4 a ton above the recent low point. Other grades are being held at prevailing maximum prices and many dealers are refusing to sell, apparently believing that higher prices will be enjoyed before the end of the month. Last week the Pennsylvania railroad declared an embargo against the shipment of scrap to eastern points. This embargo since has been modified to a considerable extent.

Market is Marking Time

New York, Aug. 14.—The scrap market still is marking time with prices nominal. The embargo on scrap recently declared by the Pennsylvania railroad remains in effect and has paralyzed such activity as had been previously evident. Mills in several consuming centers where there are no embargoes are refusing to accept material, and rejections continue numerous. The reconsignment of cars made necessary by these rejections has aggravated the traffic situation considerably. Prices are unchanged and nominal.

Embargoes Add to Dullness

Philadelphia, Aug. 13.—The embargo on shipments of iron and steel scrap recently declared effective by the Pennsylvania railroad on its lines east of Pittsburgh has accentuated the dullness previously existing in this market. However, the market has not yet reflected the influence of this action with respect to prices. If the embargo remains in effect for an extended period it is thought possible that prices may strengthen in consuming centers now unable to receive shipments, whereas prices may ease off in centers not affected by the embargo and where shipments may be heavier. The embargo on exports of scrap which becomes effective Aug. 15 has had little effect on the market in this territory, as sellers had few bookings for foreign account. This condition was due to the strength which prevailed in the domestic market up until a short time ago. The embargo which had been threatened at Coatesville was not imposed, although dealers say consumers in that center are not accepting shipments. The embargo at Harrisburg has been lifted but dealers say that here too consumers are refusing to receive material. Only a few declines in prices are noted for the past week, as follows: No. 1 heavy cast, $1; No. 1 forge, $1; bundled sheets, $1.

Some Grades More Active

Buffalo, Aug. 14.—The market is a little weaker on heavy melting steel due to the fact that there has been no buying in this grade during the past week. Shipments to Pittsburgh points have been materially interfered with by a general embargo on scrap placed during the week by the Pennsylvania railroad. The situation in car wheels, railroad malleable and stove plate has brightened perceptibly. An active demand for these three classes has not been productive of price change, however, except in the case of stove plate which has advanced $1. Trade has been practically at a standstill in all other grades. There are no stocks of heavy melting steel in the yards of dealers, and this is resulting in the latter not being inclined to make sales. It is generally believed consumers will resume buying shortly, since stocks in their hands are getting lower. Prices receded this week on bundled sheets which went from $21 and $21.50 to $20 and $21; heavy melting steel from $33 and $34 to $31 and $33; busheling No. 1, from $29 and $30 to $28 and $29; busheling No. 2 from $20 and $21 to $18 and $19, and on wrought pipe which went from $33 and $34 to $29 and $30.

Buyers Control Market

Cleveland, Aug. 14.—A buyer's market in scrap prevails in this territory to a greater degree than has been noted for some months. Trading between dealers continues on a small scale, the short interests providing the only activity. The railroads which offered a small tonnage of old material last week closed at the prices offered them. Consumers fail to be interested in prices which have been sharply shaded. Some dealers state it is almost impossible to give a flat price on any commodity since sellers are willing to close at practically whatever figure the buyer will offer. Heavy melting steel, gross tons, Cleveland, is off to $30 to $32, with few buyers.

Chicago Scrap Steady

Chicago, Aug. 14.—A better feeling is evident in the scrap iron and steel market in Chicago and dealers are trading more freely than during recent weeks. Consumers are not taking on much material, but in cases where they buy to fill immediate wants there is no hesitancy in paying the present range of prices. Evidently the possibilities of government price regulation are holding back new business. Heavy melting steel is quoted at $32.50 to $33, Chicago, but this price appears to be a result of the situation in the east rather than of local demand. Offers of $35 for this grade to be shipped into Ohio have been made to brokers and some tonnage has gone in that direction. Dealers here believe that buyers entering the market would find the quotation practically $35, delivered Chicago, for the heavy grades. In most items, the market is narrow, but buying by consumers is believed to be a matter of only a short time. Only two railroad lists are current. The Union Pacific offers 1500 tons, and the Chi-

cago, St. Paul, Minneapolis & Omaha 730 tons.

Some Grades Are Firmer

Cincinnati, Aug. 13.—The steel mills apparently are using borings and turnings to advantage and have been taking this class of scrap more freely. As a result quotations on these grades are firmer than last week, which is almost in direct contrast with dealers' reports on both heavy wrought and cast scrap. Old iron rails were reduced 50c a ton, as well as steel rails for rerolling. Dealers entertain little hope for improvement in the near future.

St. Louis Marks Time

St. Louis, Aug. 11.—Prices generally remained unchanged on scrap iron and steel in the St. Louis district last week. The rather sharp cuts of the preceding seven-day period apparently have fixed proper levels for the moment. There continues an almost total absence of new buying and the market keeps marking time. There were no railroad offerings before the market during the week. On several lists which were closed recently the roads have refused to sell at present market prices, and are holding for better terms. This may also be due to the fact that all lines are very short of equipment and in some cases have refused to deliver coal cars to their storekeepers for loading scrap material. Virtually all the large consumers in this district are out of the market but the fact that so little scrap is coming in and consumers are melting up their reserves leads to the belief among dealers that the bottom of the retrograde movement has been reached and that a turn in the opposite direction is not far off.

Southern Market Unimproved

Birmingham, Ala., Aug. 14.—The southern old material market is still in an unsettled condition and the quotations are weak. Declines are noted again in all grades except shop turnings. Plenty of stock is in hand and some of the larger consumers are not unloading their cars as promptly as they might. Dealers are figuring on some sizeable purchases of scrap and two or three deals of some magnitude have been announced.

Employes of the Pickands, Mather Co., employed at the mines in the Virginia district, who will leave soon in obeyance to military orders, were given a banquet by the company. W. P. Chinn, general superintendent, acted as toastmaster.

Heavy Shipments

Of Wire Products Go to Government Work—Capacity is Enlarged

New York, Aug. 14.—Consumers of wire products have been pressing makers for material for work in connection with government contracts. Shipments are going forward to the government military camps, nearly all of the 120,000 kegs originally distributed now having been shipped. The American Steel & Wire Co. is building an addition to its wire rope plant at Trenton, N. J., and is reported to be contemplating an extension at its New Haven, Conn., plant. It is now making wire rope at Worcester, Mass., San Francisco, New Haven and Trenton. The price of independent makers on plain wire to jobbers continues $3.95, Pittsburgh, and of wire nails, $4.

Prices Are Unchanged

Pittsburgh, Aug. 14.—The market for wire products is extremely quiet, but it is not surprising, considering the season of the year. It is not likely that any signs of activity will be noted until fall. Independent makers continue to quote on the basis of $4 a keg for nails, but are not selling much new tonnage. The American Steel & Wire Co. has made no changes in its prices. The American company is restricting its output to requirements of its regular trade. The government has taken no additional tonnages this week, according to local makers.

Market is Mixed

Chicago, Aug. 15.—A wide spread between the prices of the leading producers and independents continues in wire and wire nails. The latter are asking $4, Pittsburgh, for nails, while the former continues its quotation of $3.20, Pittsburgh. Heaviest demand at present is for army cantonment construction and most of this tonnage has been filled at the lower figure. Jobbers are said to be buying in small lots and stocks are not being accumulated. Some unusual sales conditions are being imposed, the tonnage of nails frequently being made contingent on the quantity of wire or wire products bought at the same time. An unusual demand has been met recently for bale ties, indicating an unusual tonnage of hay and straw in this year's crop or greater efforts to conserve the crop by baling. The price has followed closely the advances on plain wire and other wire products.

J. Byron Colvin, for several years superintendent of the Jackson Street Foundry, 52 Jackson street, Worcester, Mass., owned by his father, James A. Colvin, Enfield, Conn., 37 years until his death last year, has purchased the property from the estate. Mr. Colvin had operated the plant since his father's death for the estate. The product is light and heavy iron castings.

English Mills

Greatly Increase Output During 1916—Average Increase 19 Per Cent

How Great Britain greatly increased its output of various forms of rolled steel during 1916 is shown by the additional statistics of finished and semifinished production for that year given by the statistics of the Iron and Steel and Allied Trades Federation. The output of finished steel in 1916 was 7,569,479 tons compared with 6,325,844 tons in 1915, an increase of 1,243,635 tons. The production of blooms, billets and slabs sold for home consumption or export was 1,945,200 tons, against 943,545 tons in 1915, and of sheet and tin plate bars 1,272,175 tons against 1,519,577 tons during the preceding year.

The production of finished steel by-products during the past two years has been as follows:

	1916	1915
Rails	271,340	434,416
Tram rails	1,373	11,986
Sleeper and fish plates	38,891	68,717
Plates, ⅛ inch and over	1,153,385	1,160,327
Plates and sheets over ⅛ inch	780,587	1,367,577
Angles, tees, channels	757,769	762,717
Girders, joists	345,903	343,617
Merchant steel	523,546	534,503
Hoops and strips	186,416	176,036
Wire rods	203,715	169,562
Ties and axles	47,560	62,603
Pipes and tubes	111,212	104,453
Seamless tubes	65,568	63,716
Steel forgings	351,266	118,102
Steel castings	188,699	177,071
Unenumerated products	2,542 279	770,981
Totals	7,569,479	6,325,844

It is shown that the output of galvanized sheets in 1916 was 131,707 tons and of tin plate and black sheets 576,787 tons, making a total of 708,494 tons which compares with 351,593 tons, 603,386 tons and a total of 954,979 tons respectively in 1915.

In 1916, 960,107 tons of puddled iron bars and 953,742 tons of finished iron were produced. This compares with an output of 942,906 tons of puddled iron bars and of 1,015,911 tons of finished iron in 1915.

Officers of the Thompson Machine Co., Canton, O., recently incorporated with $10,000 capital to manufacture dies, tools, jigs and fixtures are as follows: President, Charles C. Thompson; vice president, William Miller; treasurer and general manager, D. H. Rose, and secretary, William Bauman.

Export Record Greatest in History

Ending of Fiscal Year With June Shows 6,865,588 Tons of Iron and Steel Sent Abroad—Pig Iron, Billets and Bar Shipments Account for More Than Half of Total Movement

THE tremendous growth in the exports of iron and steel for the fiscal year ended June 30 is impressively displayed by the complete report of the bureau of foreign and domestic commerce which has just been made public. The fiscal year has established a record far surpassing that of any previous year in point of tonnage and product valuation and bids fair to remain the banner year for the export trade for a good many years to come.

During June pig iron shipments abroad aggregated 81,999 tons, an increase of approximately 20,000 tons over May, making a grand total for the year of 833,523 tons, as against 286,728 in 1916. Exports of billets, blooms and slabs were heavy during June with a tonnage of 192,133, increasing nearly 20 per cent over the May tonnage. This

IMPORTS AND EXPORTS, GROSS TONS.

1915	Imports	Exports
July	20,858	380,340
August	27,556	405,850
September	23,345	382,113
October	34,318	349,843
November	37,131	362,764
December	35,408	353,853
1916		
January	15,824	360,102
February	20,279	368,980
March	15,159	438,649
April	20,176	384,452
May	32,114	540,580
June	26,786	526,759
July	14,729	503,187
August	32,257	597,739
September	25,559	643,762
October	30,169	610,110
November	42,545	554,856
December	44,134	580,957
1917		
January	40,192	608,105
February	24,379	449,099
March	37,280	606,559
April	48,213	519,397
May	26,013	588,514
June	.....	614,600

brings the total for the year to 1,937,252 tons, which compares with the 962,097 tons in 1916. Sheets and plates exported totaled 96,891 tons during June, increasing the twelve months figures to 692,888 tons. Foreign shipments of rails, bars and structural steel for the year were 601,063 tons, 749,959 tons and 339,480 tons, respectively. Each displayed a slight decrease over May figures. The comparative figures for June show: Rails, 42,078 tons in 1917 against 48,881 tons for 1916; bars, 52,232 tons in 1917 against 61,016 tons in 1916, and structural iron and steel 19,506 tons for 1917 against 25,417 for the preceding year.

Expressed in tons, the aggregate of all exports of iron and steel for 1917 was 6,868,978, as compared with 4,843,273 for the year preceding, while the valuation of these exports are placed at $119,141,836 and $76,279,136, respectively. The total value of all machinery exported during June was $27,946,036, against $20,538,391 for June, 1916, a gain of approximately $7,000,000. The

IRON ORE IMPORTS, GROSS TONS.

	June, 1917	June, 1916	Year ending June, 1917	Year ending June, 1916
Spain	30	4,495	216,046	94,366
Sweden	17,015	19,714	147,610	223,559
Canada	12,388	41,935	111,999	142,570
Cuba	25,413	56,910	613,308	807,859
Oth. countries	.....	11,100	60,995	157,363
Total	54,846	134,154	1,149,958	1,425,717

valuation of all machinery for outboard shipment for the year shows $262,241,278 and $182,673,082 for 1917 and 1916, respectively. Metal working machinery valued at $8,587,248 was sent abroad during June, against $8,465,985 for the corresponding month of last year. A total of $84,435,410 worth of machinery was exported during the fiscal year ended June, 1917, as compared with $61,315,032 for fiscal year ended June, 1916. Foreign shipments of motor trucks fell off during June and were valued at $2,965,254, compared with $3,551,148 in the same month of 1916. The total value of motor trucks for overseas trade decreased to $42,337,315 for the last fiscal year from $56,805,548 made in 1916. A large increase was shown in exports of agricultural implements. The total for June, 1917, was $3,977,256,

EXPORTS, GROSS TONS.

1916	Pig iron	Semi-finished material
Jan.	18,719	55,315
Feb.	15,061	87,306
Mar.	19,439	107,696
Apr.	18,518	88,764
May	28,293	142,782
June	48,770	116,425
July	28,718	135,827
Aug.	60,264	160,931
Sep.	64,122	163,104
Oct.	101,756	162,679
Nov.	102,786	125,038
Dec.	105,195	162,901
1917		
Jan.	69,146	183,636
Feb.	49,018	131,566
Mar.	69,629	193,469
Apr.	44,783	174,039
May	61,112	168,158
June	81,999	192,133

against $1,793,355 for the same month of 1916, and the aggregate for the year was $84,435,410, against $61,315,032 for the year before. While maintaining a good record for the year of $66,108,586, which compares favorably with $45,867,156 for the year before, zinc exports, excepting ore and dross, fell to $3,602,070, nearly 40 per cent lower than the export valuation of $5,161,552 in the preceding year.

An increase is noted in the amount of nickel, nickel oxide and matte exported in June when comparing June's tonnage of 803 with that of the same month of last year when 1024 tons were sent overseas. The total for the year ended June, 1917, was 13,841 tons as compared with 11,450 tons for the fiscal year ended June, 1916. Figures for the year show that ferrovanadium exports increased to 1168 tons, against 497 tons for the preceding year. Exports of ferrotungsten and tungsten metals aggregated 797 tons for the last fiscal year. No record was kept of this tonnage for June, 1916.

Iron ore imports for June, 1917, were less by more than 100 per cent than

IRON AND STEEL EXPORTS, GROSS TONS

	June, 1917	June, 1916	Year ending June, 1917	Year ending June, 1916
Scrap	9,692	15,867	237,801	157,710
Pig iron	81,999	48,770	833,523	286,728
Steel billets, ing. & bl'ms	192,133	116,316	1,937,252	962,097
Wire rods	17,128	18,046	147,257	171,527
Steel rails	42,078	48,881	601,065	538,278
Steel bars	52,232	61,016	749,959	625,574
Iron bars	5,951	6,056	64,681	70,508
Struc. iron and steel	19,506	25,417	339,480	270,311
Hoops, bands and scroll.	5,875	4,006	48,087	41,164
Sh'ts & plates.	96,891	42,581	692,888	491,310
Tin and terne plate	25,460	29,749	232,947	230,467
Barbed wire.	17,368	37,499	303,197	364,236
All oth. wire	21,911	30,332	242,218	251,806
Cut nails	359	372	4,611	4,425
Wire nails	9,822	17,187	124,677	128,696
All oth. nails incl. tacks.	2,934	1,066	19,894	9,633
Pipes & fit'gs	6,915	5,878	228,719	166,072
R. R. spikes	2,278	2,099	19,111	26,403
Bolts, nuts, rivets and washers	2,798	2,155	29,530	30,841
Horseshoes	256	1,368	4,280	13,124
Cast radiators	1,014	193	4,801	2,363
Total	614,600	515,214	6,868,978	4,843,273

those for June, 1916. A total of 54,846 tons were imported as compared with 134,154 tons in June, 1916. The fiscal year's figures show a total of 1,149,958 tons, as contrasted with the 1916 figures of 1,425,717 tons. As in previous months, Cuba continues to be the chief foreign source of iron ore, showing an import tonnage in June of 25,413, and a total for the year of 613,308. A small shipment of 30 tons from Spain in June contrasts with the shipment of 16,434 tons made during the preceding month. Sweden made a record-breaking showing in June with 17,015 tons delivered, after the poor showing in May of only 2237 tons.

More Cars

Is Crying Need of Ore Traffic—Furnace Estimates Heavy

Cleveland, Aug. 15.—Considerable delay is being experienced by Lake Superior ore carriers at lower lake ports, the car shortage at Cleveland and Ashtabula being more pronounced this week than before. A few days ago nine vessels were lying off Cleveland harbor unable to discharge cargoes and 17 vessels were in a similar position at Ashtabula. Delay amounting almost to a full week has tied up some vessels at lower lake ports.

A committee of vessel owners is co-operating with coal shippers at Cleveland and is assigning vessels to most needy docks each day. This is having its effect upon the coal movement which is becoming better at lower lake ports. Coal destined for the northwest has begun to move toward lake ports from Pittsburgh in larger volume and the movement may reach 1,000,000 tons this week. This will provide more empty cars for ore which is the crying need today of the ore trade.

Furnaces are expecting to receive apportionment of ore shipments most any day. Their aggregate estimate of needs of ore necessary to run to June 1 next is between 66,000,000 and 67,000,000 tons. It is figured returning ore vessels must carry to the northwest an aggregate of 32,000,000 tons of bituminous and anthracite fuel during the present season. Some wild chartering is being done on ore at $1.50 from Duluth, $1.30 from Marquette and $1.10 from Escanaba.

Completing New Stacks

Chicago, Aug. 14.—Construction of the new blast furnace stack of the Iroquois Iron Co. at South Chicago has progressed sufficiently to indicate that it will be in blast during the first quarter of 1918. Another stack being built from the same drawings by the Mark Mfg. Co. at its steel plant at Indiana Harbor will be completed somewhat later. These stacks will add materially to the pig iron production in this territory. They are of large capacity and latest design. The Mark Mfg. Co.'s stack will release at least one stack at the Iroquois plant, which is now practically withdrawn from merchant production.

Directs New Company

W. E. Moore, Pittsburgh, as president, is directing the affairs of the General Steel Co., St. Francis, Wis., a Delaware corporation formed by the reorganization of the Valley Steel Co., in the erection of a steel mill at St. Francis. A Wisconsin charter has just been taken out. Other officers of the company include P. A. E. Armstrong, vice president, and W. F. Peterson, assistant secretary.

More Wooden and Steel Ship Contracts Let

Washington, Aug. 15.—(By wire.)—An official bulletin issued today says contracts have been let in the past two days for 39 wooden hulls, for six standard 8800-ton steel ships of the Robert Dollar type and for three 6000-ton steel cargo carrying steamers. These contracts have been distributed among 12 builders. The names of the successful yards have been withheld. The value of the 48 contracts is given as $22,465,320. The wooden ships are listed at $300,000 each, the largest steel vessels at $1,364,000 each and the smaller ones at $908,440 each. The conditions of the contracts require completion of the vessels within the shortest possible time.

M. H. Curley, formerly New York representative of the Putnam Machine Co., Fitchburg, Mass., died at his home in Dorchester, Mass., Aug. 9, after a long illness, aged 77 years.

Scrap Rises

In Pittsburgh—Ferro Sells at $375—Heavy Melting Steel at $38

Pittsburgh, Aug. 15. (By wire.)—Steel manufacturers who sold tonnages for export are anxious to ascertain whether the embargo against the shipment of material abroad will be modified. Both Japan and Italy have been conspicuous buyers of electrical sheets, paying 15 and even higher for the bulk of the material purchased.

Small lots of prompt ferromanganese have been sold at $375, and several consumers have awarded tonnages for the first quarter at $350, delivered.

Heavy melting steel has commanded $38 a ton, or $3 a ton above the previous prevailing minimum price. Other grades of scrap reflect strength.

The Fulton Foundry & Machine Co., Cleveland, has acquired the plant and other assets of the Fulton Foundry Co. No changes in the management were made.

The Non-Ferrous Metals

Copper Lead Spelter Tin

New York, Aug. 14.—Developments in Washington relative to the price-fixing policy of the government continue to absorb the interest of the metal trade. Rumors of various kinds are ever before the market, but there appears to be nothing at all definite in these. In fact nothing is expected until the federal trade commission hands in its report on production costs. Buyers and sellers, as a result of this uncertain situation, still maintain their policy of keeping as far apart as possible. Inquiries are few, and buying is noted in only a few isolated cases when consumers are forced to cover on their immediate needs. During the past week prices on copper have been largely nominal and easier on the offerings of small sellers. Electrolytic copper today may be quoted in terms of cash as follows: Spot, 27c to 27.50c; August, 26.75c to 27.25c; September, 26.50c to 27c; and last quarter, 26c to 26.50c. Little lake copper is being offered, but it is believed this grade could be obtained from 28c to 29c, cash, New York. Casting copper is holding nominally at 26.50c to 27c.

Spelter also has presented a very quiet front. Owing, however, to the fact that market is holding at about cost, prices, despite the inactivity, have held firm. Prime western for prompt shipment may be quoted nominally at 8.50c, St. Louis, for prompt and August, 8.50c to 8.62½c September, and 8.62½c for last quarter. Brass special for prompt shipment is quoted nominally at 9c to 9.25c, St. Louis.

Following declines at London during the past several days, the tin market here has slumped off somewhat. Straits tin for spot shipment is holding nominally at 62.75c, New York. Trading during the past week has remained very quiet.

The position of the lead market is somewhat a mystery to the consumer, who is unable to size up the situation with any degree of accuracy owing to the action taken by the government in not disclosing its lead requirements to the public. This in addition to the general uncertainty, has worked for a dull market during the past week. The American Smelting & Refining Co. and several of the larger independents are holding very firm at 10.92½c, St. Louis. The outside market may be quoted 10.62½c to 10.87½c, St. Louis, on lead for prompt and August shipment.

Antimony, although not directly affected by the government's price-fixing policy as yet, reflects the dullness characteristic of the markets generally. Chinese antimony for spot and August shipment is holding nominally at 15.50c, duty paid; and September and October, 15.75c.

The outside aluminum market is quiet and may be quoted as follows: No. 1 virgin, 51c to 53c; No. 1 remelted, 49c to 51c; and No. 12, 39c to 40c.

Metallurgy of Titanium Ferroalloys

How Titanium is Reduced from Its Mineral Ores—The Manufacture of Ferro-carbon-Titanium and Carbon-free Ferrotitanium and the Uses of These Alloys in Iron and Steel

BY ROBERT J. ANDERSON

IT IS a singular fact that whereas in most instances a commercially successful product is the result of the labor of many men, the wide use of ferrotitanium is directly due to the work of one man—A. J. Rossi, dean of titanium investigators. The service that titanium in the form of its ferroalloys renders to the iron and steel industry is one that is becoming more indispensable as the demands for quality become more exacting. A large industry has been reared upon the exploitation and sale of such an alloy, and in another plant it is one of the principal products made. The success of Rossi after many years of endeavor is sure to reawaken the latent interest in other of the now more or less rare elements, including boron, calcium, strontium, barium, zirconium and others.

Elemental titanium has not been used to any extent, but its alloys have found far-reaching employment in the metallurgy of iron and steel and in nonferrous work. Recent developments in the use of the electric furnace, with its concomitant high temperatures, have encouraged the exploitation of processes for the reduction of titanium from its mineral ores, as well as the manufacture of titanium alloys on a large scale.

Titanium is a constituent which is characteristic of certain pyrogenetic compounds. The commonest occurrences are as ilmenite, $FeTiO_3$; rutile, TiO_2; titanite, $CaTiSiO_5$; and perofskite, $CaTiO_3$; and it is often concentrated in beds of titanic iron ore The source of commercial titanium is confined exclusively to the titanium ores, namely rutile, ilmenite and titaniferous magnetite, the most important of which, at present, is rutile. The known distribution of rutile in commercial deposits is limited indeed; the more important ones are confined to two localities in Virginia and one each in Canada, Europe and Australia.

The most important occurrence of rutile in Europe is in Norway, where the mineral is found as a large aplitic dike near Kragero on the southeastern coast. The only commercial occurrence of rutile in Australia is near Mt. Crawford, but other non-commercial occurrences are known. Micro-photographs of ores from these countries are shown in Figs. 1 and 2. The rutile deposits of Virginia are described at length by T. L. Watson and S. Taber in a bulletin, "The Titanium and Apatite Deposits of Virginia". These deposits are of particular interest because of their scientific and commercial importance. They are the only known workable rutile deposits in the United States at present. Practically the entire production of rutile in Virginia has been turned out by the American Rutile Co. at its Roseland mill, a view of the plant being shown in Fig. 5.

Quite a large number of binary and a few ternary alloys of titanium have been investigated by metallographic methods, but the only alloys on the market for commercial consumption are ferrocarbon-titanium, ferrotitanium, cuprotitanium and manganotitanium. The alloys of titanium with iron were the first to receive marked attention, and of late years their use has increased largely, particularly by reason of their being employed as purifiers in iron and steel metallurgy. As already stated, the present presence of titanium as an active agent in the iron and steel industry is directly due to the labors of A. J. Rossi, who has devoted some 30 years in this field. Abroad, H. Goldschmidt brought out the first successful practical process for the reduction of titanium from its ore by means of his now well-known alumino-thermic method.

Closely related to the subject under discussion may be mentioned the important problem of the reduction on a large scale of titaniferous magnetites which confronts American iron makers. Large bodies of easily mined titanium-bearing magnetites have been discovered from time to time, and a considerable mass of literature is at hand dealing with their geological occurrence and probable economic value. The approach, in the far-not-distant future, of the possible exhaustion of the deposits of nontitaniferous iron ores and the present use in blast furnace plants of lower tenor iron ores point the way to the necessity of turning to the titanium-bearing material for smelting.

The general feeling among works managers is that iron ores containing in excess of 1 per cent of titanium

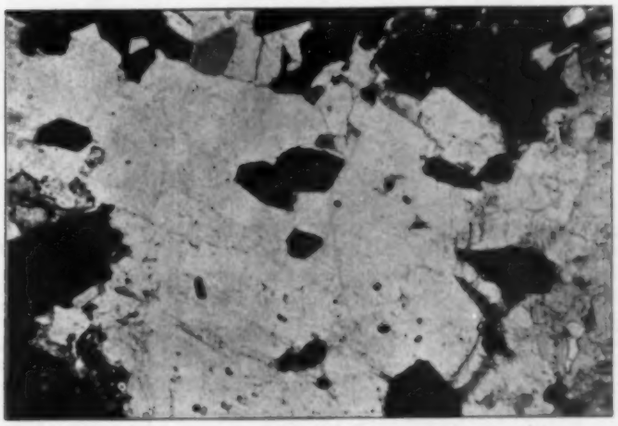


FIG. 1—KRAGERITE, A RUTILE-BEARING APLITE FROM KRAGERO, NORWAY (After Watson and Taber)

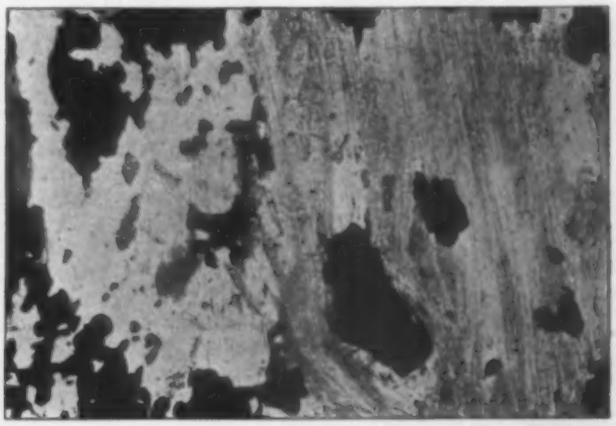


FIG. 2—RUTILE-BEARING PEGMATITE FROM SOUTH AUSTRALIA (After Watson and Taber)

are difficult to smelt in the furnace in spite of the demonstrations of Rossi and other workers to the contrary. The recent able dessertation by Joseph T. Singewald Jr., in United States bureau of mines bulletin No. 64, gives the most complete and latest account of the situation. Prominent workers in the titanium field in addition to Rossi and Singewald have been Haanel, Forbes, Corse, Comstock, Waterhouse and others.

Rossi's Work

For the sake of clearness, it is well to distinguish between the two most prominent titanium alloys on the market; these are the ferrocarbon-titanium of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y. (the Rossi interests), and ferrotitanium, the carbon-free product of the Goldschmidt Thermit Co., New York. Rossi's work leading to the production of what is now known as ferrocarbon-titanium is summed up for brevity in the following: He procured a patent in 1892 pertinent to the reduction of titaniferous ores in the blast furnace; shortly afterward he attempted to make an iron-titanium alloy in the blast furnace and crucible but was unable to obtain a product rich in titanium. Experimental work conducted with the electric furnace resulted in the production of a commercial iron-titanium alloy for use in steel and iron metallurgy.

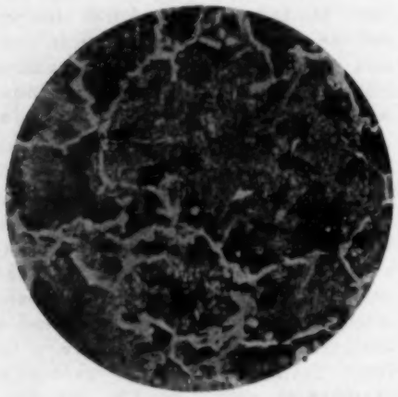


FIG. 3 — SECTION OF UNTREATED STEEL RAIL FROM TOP OF HEAD; ETCHED TO DARKER PEARLITE LEAVING FERRITE WHITE
Multiplied by 100 Diameters (After Comstock)

The carbon-free product of the Goldschmidt Thermit Co. contains from 3 to 6 per cent of aluminum alloyed with the titanium. This alloy has been used for a number of years in European steel works as a final deoxidizer in casting practice. The titanium alloys, when made by the alumino-thermit process, are more expensive than those made in the electric furnace, and this is a cogent factor militating against their use.

Ferrocarbon-titanium contains from 5 to 8 per cent of carbon, mostly in the form of graphite, the combined carbon being present in small amount. Analyses show the relative amounts of combined and graphitic carbon in four samples of this material:

GRAPHITE	COMBINED CARBON
Per Cent.	Per Cent.
9.601	0.147
9.179	0.120
7.012	0.130
6.234	0.118

This alloy sold is guaranteed to contain at least 15 per cent titanium and has an average analysis as follows, according to the manufacturers:

	Per Cent.
Silicon	1.41
Titanium	15.79
Carbon	7.46
Manganese	0.11
Aluminum	0.80
Phosphorus	0.05
Sulphur	0.08
Iron (by difference)	74.30
Total	100.00

Dr. Goldschmidt has said that carbon-free metals dissolve with greater ease than those same metals containing carbon, because the carbon is present in the form of carbides in the latter. Charles V. Slocum, on the other hand, found that the carbon-free alloy was not at all adapted to the metallurgy of iron and steel in the rolé of a deoxidizer and purifier. Regardless of which view is correct for the present, both alloys have found employment. The Goldschmidt alloy has the following average analysis:

	Per Cent.
Silicon	1. to 1.5
Titanium	25.0
Carbon	nil
Manganese	nil
Aluminum	5.0 to 6.0
Phosphorus	0.05
Sulphur	0.01
Iron	difference

Mode of Manufacture

All of the iron-titanium alloys now made, whether carbon-free or not, are made either by the reduction of titaniferous ore in the electric furnace with carbon, or by the Goldschmidt thermit method, since a method giving 2000 degrees Cent. or over is required for the reduction of TiO_2. Most of the amount produced now is made by the first named process. In one of the Rossi processes, the reduction may occur in a bath of aluminum, the aluminum, in ingots or any other convenient form, being melted in the electric furnace. Pig iron or scrap iron is then added to the charge, and next rutile is introduced. The temperature of the bath is then raised to a point required to start the reaction whereby the aluminum combines with the oxygen of the rutile. By this reaction

$$3\,TiO_2 + 4\,Al = 2\,Al_2O_3 + 3\,Ti$$

the rutile is reduced to metallic titanium which alloys with the iron. The product obtained in this manner is practically carbon-free.

Smelting Cost Increased

In the event that ilmenite or titanic iron ore is used in place of rutile, a much larger amount of aluminum is required to reduce the ferric oxide, thus increasing the cost of manufacture because the iron can be more economically reduced by other methods.

Where the alloy is prepared by reducing oxide of iron and titanium with carbon in the electric furnace, the product contains from 5 to 9 per cent of carbon mainly in the form of graphite. Carbon is at present used exclusively by the Titanium Alloy Mfg. Co.., replacing the aluminum bath method once used. The process is described at length in letters patent, both domestic and foreign. In United States patent No. 609,466, Aug. 23, 1898, Rossi specified the reduction of titaniferous ore and rutile by means of carbon in an electric-resistance furnace, with the production of a ferroalloy containing over 5 per cent of titanium and some carbon, the reduction occurring in a bath of molten iron. Titaniferous slag was also to be treated in a similar manner in a like patent. Two years later, he patented a process calling for the reduction of titaniferous ores in a bath of molten reducing metal such as aluminum, in the electric furnace. In 1901 he procured a patent for the concentration of titanium in slag by the reduction of the silicon and iron of a titaniferous ore with carbon, the temperature of operation being below the fusion point of titanium oxide.

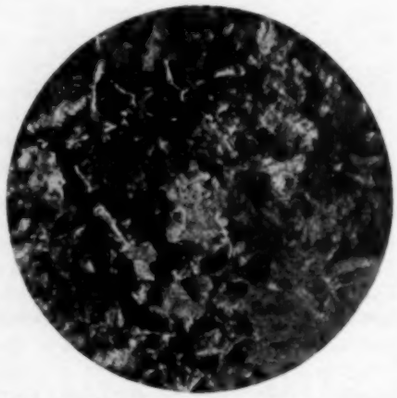


FIG. 4—SECTION OF TREATED STEEL RAIL FROM TOP OF HEAD; ETCHED TO DARKEN PEARLITE LEAVING FERRITE WHITE
Multiplied by 100 Diameters (After Comstock)

Many more patents have been secured by the Rossi interests in recent years.

An iron-titanium alloy is produced at one plant on a commercial scale in a Siemen's electric furnace of 500-kilowatt size. Titaniferous ore, or slag, or rutile is introduced onto the top of a molten bath of scrap iron or steel. The reduction takes place in the arc, and the product is tapped off. According to Keeney, the titaniferous ore charged has this analysis: 34.36 per cent TiO_2; 50.53 per cent FeO; 4.14 per cent SiO_2; and 2.20 per cent Al_2O_3. Slag from the process, if high in titanium, is recharged. The product obtained from the reduction analyzes 10 to 15 per cent titanium; 5 to 8 per cent carbon, and 0.35 to 1.00 per cent silicon. If this alloy is refined, employing rutile as a decarbonizing agent, a product is secured analyzing 10 to 15 per cent titanium, 0.35 to 1.00 per cent silicon, and less than 1 per cent carbon. In order to reduce the amount of titanium lost through volatilization, Rossi in a late patent calls for the introduction of lime, CaO, onto the molten iron bath, following this with titanic oxide, lime and carbon. This causes a reaction with the metallic titanium according to the following equation which is familiar to all students of this problem:

$$Ti O_2 + Ca O + 5 C = Ti + Ca C_2 + 3 C O$$

In the Goldschmidt process, the metallic oxides, which are to be reduced, are mixed with aluminum in the proper amounts, both oxides and the metal being in a finely powdered state. Ignition with a fuse brings some point of the mixture to the temperature at which aluminum and oxygen combine. Once started, the reaction proceeds to completion with the simultaneous reduction of the oxides. The high cost of aluminum powder and the difficulty of securing a pure product are objections to the process. The reaction which takes place is according to

$$3 Ti O_2 + 4 Al = 3 Ti + 2 Al_2 O_3$$

The reaction may be started over a molten iron bath by the heat thereof. The product given by the Goldschmidt thermit process contains from 5 to 6 per cent aluminum alloyed with the titanium.

In a late United States patent granted to Drs. Hans Goldschmidt and O. Weil, Germany, assigned The Goldschmidt Thermit Co., the method of making alloys higher in titanium are stated. The purpose of these alloys is to provide a modicum for adding a higher percentage of titanium to iron and steel baths, thereby overcoming otherwise alleged objections to low-titanium content alloys. These alloys contain 15 to 35 per cent titanium, 1.5 to 3.5 per cent aluminum and the remainder iron. The aluminum lowers the melting point of titanium by combining therewith to form an aluminum-titanium alloy, the alloying qualification being thereby increased, so it is stated.

For some reason or other there has existed a considerable scepticism as to the influence exerted by titanium when used as an additive agent in iron and steel metallurgy. That titanium does have a profound effect upon steels so treated is shown by the incontrovertible evidence brought out by actual experiment and that gleaned from the apparently trustworthy literature. In general, it may be stated that the addition of titanium to steel exerts an important influence on its properties, and its use is to be recommended to steelmakers who have any regard for the quality of their product.

FIG. 5—MILL AND SURFACE PLANT OF THE AMERICAN RUTILE CO., ROSELAND, VA. (After Watson and Taber)

In the form of one of its ferro-alloys, titanium is used rather widely at present, and its use bodes to increase although there has been some falling off in its employment for the treatment of bessemer-rail steel. As a final deoxidizer and denitrogenizer in the metallurgy of steel, it follows the usual treatment for these objects with ferro-manganese, or spiegeleisen, and ferrosilicon. Leading metallurgists seem to agree that titanium achieves its remarkable results by reason of its strong deoxidizing powers, together with its effect of giving the slag sufficient fluidity to completely separate it from the metal. The presence of titanic oxide, TiO_2, lowers the fusion point of occluded slags in iron and steel thereby imparting a fluidity which will account for their removal. The statement that occluded oxides and gases such as ferric oxide, Fe_2O_3; ferrous oxide, FeO; free oxygen, and nitrogen are undoubtedly the real causes of many of the difficulties of steelmakers need scarcely be made. The intense affinity of oxygen and titanium is a sure means for completely deoxidizing a steel, the advantage of which calls for no comment. It has been proved that an ingot of steel containing a very little titanium is practically free from segregation. Bessemerized and Tropenas - converted steels are known to contain the largest amounts of occluded oxides and gases, with open - hearth, crucible and electric - furnace steels folowing in the order named—the reason for this being in their mode of manufacture. Titanium has a strong chemical affinity for oxygen and will remove even traces of it from a bath which otherwise would not be affected by the ordinary deoxidizers. Its property of removing occluded oxidized substances by causing them to separate readily is unique. In removing nitrogen, titanium stands as one of the very few elements which unites with this inert gas. The fact that titanium lessens segregation should not be unexpected in view of the well-known influence of agents which deoxidize and thus quiet a wild metal.

Titanium seems to exert but little direct effect upon the constitution or structure of steels. It is known to lower the position of the Ar_3 point, but it exerts little influence upon the positions of Ar_2 or Ar_1. Steels containing high percentages of titanium exhibit normal pearlite under the microscope. Photomicrographs of titanium-treated and untreated steels, after George F. Comstock, are shown in Figs. 3 and 4.

The modern method of employing titanium is to augment the incompleted cycle of deoxidation by using one of the iron-titanium alloys after the other deoxidizers have been added. The other deoxidizers may be added either in the furnace or in

the ladle, but it is best to add the titanium in the ladle, and to give sufficient time for the titanium to complete its scavenging action. Thus the ladle will be held for from 5 to 10 minutes prior to pouring so that the entrained slag, which is thus made more fusible, may have time to rise to the surface. There is no opportunity for the bath to thus chill as the titanium reaction with oxygen is exothermic, giving rise to 215,000 calories. The amount of titanium alloy to be added is normally very small and should be proportional according to the quantities of impurities present.

Regarding the specific rationale of adding the titanium alloys: They are added preferably in the ladle of steel after tapping from the furnace, but before the slag has commenced to run. For soft, mild steel an addition equivalent to 0.03 per cent titanium is sufficient under normal conditions, and, in general, larger amounts may effect increased benefits, but not always.

Titanium in Open-Hearth Work

In acid, open-hearth practice, ferromanganese and ferrosilicon are added to the ladle as soon as the ladle bottom is covered with hot metal from the tap, as is normal American practice. The titanium addition follows then as soon as possible. As already stated, the titanium addition is to be made before the slag begins to run, otherwise it is difficult to force the alloy down through the layer of slag on top of the bath. The ladle is to be held for 5 to 10 minutes so that the impurities scavenged out may have sufficient time to rise to the surface and join the slag. In the event that the titanium alloy is added in the furnace, considerable care should be exercised to prevent its contact with the slag, and it should be quickly rabbled into the bath. Tapping of the heat should follow at once, as delay will defeat the object in view. In basic open-hearth work, it appears expedient to add about 75 per cent of the ferromanganese in the furnace and the remainder in the ladle with the ferrosilicon. The titanium alloy should then be added to the ladle in the manner already described, observing the proper precautions.

In the bessemer process, the titanium alloy should be shoveled into the stream of metal as it is being poured into the ladle, the steel having been first recarburized in the converter prior to pouring, as is normal procedure. Since the titanium reacts with vigor with molten silicate slags, the alloy should be given a thorough stirring into the metal before the slag flow starts, otherwise much of it will be wasted and its effect lost. The ladle is held for from three to five minutes before teeming so that the titanium may have time to complete its action and remove as much of the dissolved oxygen, nitrogen and entrained oxides and slag as possible.

Some writers state that the alloys should not be preheated before adding to an iron or steel bath, while others urge the necessity of heating it red hot before using. Practical experience shows that it does the work cold as well as hot, and the general tendency is toward cold use. There is wide divergence of opinion as to whether or not the alloys should be used in conjunction with aluminum.

Of all the appliances used for the production of liquid steel, the electric furnace admittedly does give a thoroughly deoxidized metal. Whether or not the steel has been deoxidized in the furnace, it will be somewhat reoxidized on tapping into the ladle, and slag will also become entangled with it during this time. For electric furnace practice, whether acid or basic, it is well to add the titanium alloy during the tapping of the steel into the ladle in the same way as in bessemer and open-hearth work, and the ladle is held as usual. In crucible practice, the best results have been secured by adding the alloy to the pots before they are removed from the furnace and allowing time for the reactions to take place before teeming.

The effect of titanium on cast iron has been the subject of much discussion; not a great amount of data is at hand for the accurate solution of the question, but the probabilities are that the element has quite contradictory effects. This is presumed to arise from its varying action with the different impurities present. In an extensive paper in 1912 before the American Institute of Mining Engineers, Bradley Houghton recorded data pertinent to the effect of titanium on cast iron, and one particular point is to be noted from his findings, for the reason that it stands forth very prominently, and that is that titanium unquestionably reduces the chill. This should not be totally unexpected in view of the action of the metal as a deoxidizer and denitrogenizer. The elements oxygen and sulphur (and probably nitrogen) are productive of chill, and titanium by removing them consequently removes their chilling action.

It appears on the whole that not much benefit can arise from using titanium in the metallurgy of iron, but recently its use has been recommended by Dr. Moldenke as worthy of employment for the removal of nitrogen and oxygen where special irons are to be produced. Some metallurgists held for a long time that titanium rendered cast iron tough, probably because the well-known pig iron of Upper Styria contains a small percentage of the element.

In iron-foundry practice, the usual method of employing titanium is to scatter a predetermined amount of a titanium alloy along the runner prior to tapping. Upon tapping, the titanium alloy is washed into the ladle with the stream of iron. As in steel practice, time should be allowed for the chemical reactions to complete themselves, so that the ladle should be held for about three minutes before pouring. Also, as in steel-practice, care should be taken so that the alloy does not come into contact with the slag, as slag attacks the alloy with very great avidity thus destroying its function. Iron may also be treated in the ladle by adding the titanium alloy to the ladle before or during tapping. In small hand ladles it is an easy matter to stir the iron with a rod in order to thoroughly incorporate the alloy. For usual deoxidizing purposes, about two to four pounds of a 15 per cent titanium alloy per ton of iron proves satisfactory.

Value of Titanium in Iron

L. Treuheit experimented with the effect of additions of 10 to 15 per cent titanium and 25 per cent titanium alloys on iron and arrives at the conclusion that the benefits derived from their use is small. The chief, and seemingly the only, value of titanium in the treatment of iron lies in its ability to deoxidize the metal. The element undoubtedly scavenges from the product of the cupola or air-furnace oxides and occluded gases, as well as nitrides. On this basis, a certain given amount of titanium will cleanse any given iron; any less will be insufficient, while any more will not make the iron better.

Experiments by Dr. Moldenke show that the addition of titanium is beneficial in the case of gray iron, but that larger additions do not result in any additional benefit. Only a small advantage appears to have been secured in treating white irons with the element. Dr. Moldenke insists that the titanium addition is of advantage if no more is used than is required for the purpose of deoxidation. The use of iron-titanium alloy in the production of white iron for conversion into malleable castings, however, is as yet only in the experimental stage.

A Well Equipped Converter Foundry

Novel Methods of Handling Metal in Cupola, Converter and Ladle Reduce Amount of Equipment Required—Sand Blasting Apparatus in Cleaning Room Unusually Complete

I WISH I had a dollar for every statement that I have ever heard to the effect that "all foundries are practically the same". Talk with almost any foundryman and he will tell you that a particular casting plant "is just like all the others".

The last man to reveal this remarkable fact to me was Tom Marshall, beaming salesman of the United Foundry Equipment Co. When he learned that I was going to Springfield, O., to secure a description of the new converter foundry of the Blackwood Steel Foundry Co., he assembled all of the cynical sagacity of his 20 years in the foundry equipment business in an effort to prove to me that Blackwood's plant was no different from the many other converter foundries in the country.

"What are you going to write about the place?" he demanded. "I've seen Blackwood's establishment, and believe me, he has a good line of equipment and knows the business, but his shop looks like all the others. All you can say is that he has a new plant, that each building is so many hundred feet long and so many feet wide, that the melting equipment consists of so and so, and that the cleaning apparatus was installed by Smith, Jones & Co. As far as I can see, all you can possibly do is to write the same old story. Why don't you describe a plant where there is something new to talk about?"

Not having seen the Blackwood foundry I could not bring forth tangible proof that it was "different", but I carefully assured Marshall that I would surely find something unusual in the Springfield casting plant.

"Oh, that's all right to say. The optimism of the cub is still at high tide in your veins. You'll get over that. I suppose you will come back with the same dyed-in-the-wool yarn that every trade journal has been using in the last 20 years in describing new plants and their equipment."

With this parting shot, he left me pondering over the question his frank remarks had aroused. Are or are not all foundries alike?

* * *

After a brief survey of the various departments of the Blackwood foundry I had the feeling that possibly Marshall was more nearly right in his contention than I. As he had said, to all outward appearances there were few marks to distinguish the plant from any of the many converter foundries in the country. The only noticeable feature that I observed was that the cleaning room equipment was unusually complete. In fact, I could recall only one or two foundries in which the sand-blast apparatus accommodated the large range of castings handled by this equipment in the Blackwood plant.

Satisfied that in the main, the equipment was not of sufficient novelty to warrant a lengthy description I turned my attention to the methods of operating the foundry, and here I found the features which distinguish this steel foundry from all others. In reading the following account of what I learned at Springfield, the reader will realize that every plant has its individual characteristics. Two plants with identical equipment throughout

Editor's Note

Personal impressions are always interesting. Conventional plant descriptions, on the other hand, are prone to be as dry as dust. The accompanying article presents in a frank, personal way the essential features of the organization, equipment and methods of the Blackwood steel foundry. The editor believes this method of treatment will commend itself to the readers of The Iron Trade Review. It's the next best thing to taking a stroll through the shop yourself.

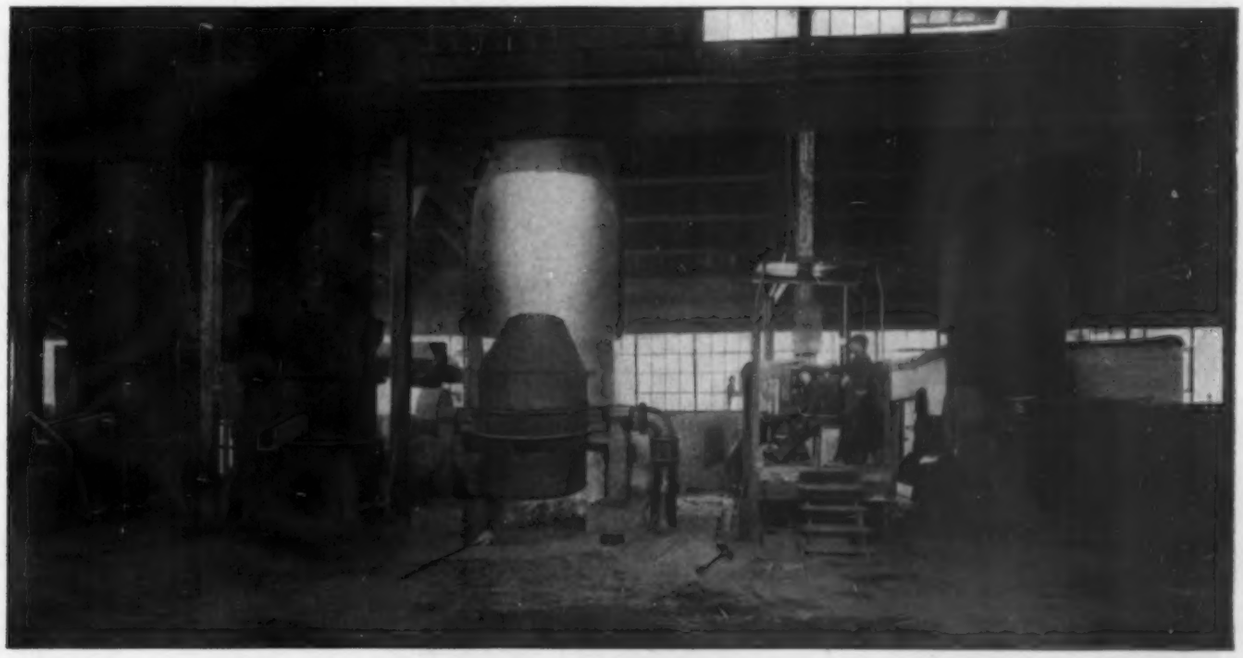


FIG. 1—ARRANGEMENT OF MELTING EQUIPMENT—THE MANNER IN WHICH THE DESIGN OF THE TWO-PIECE CONVERTER FACILITATES RELINING IS INDICATED AT THE RIGHT

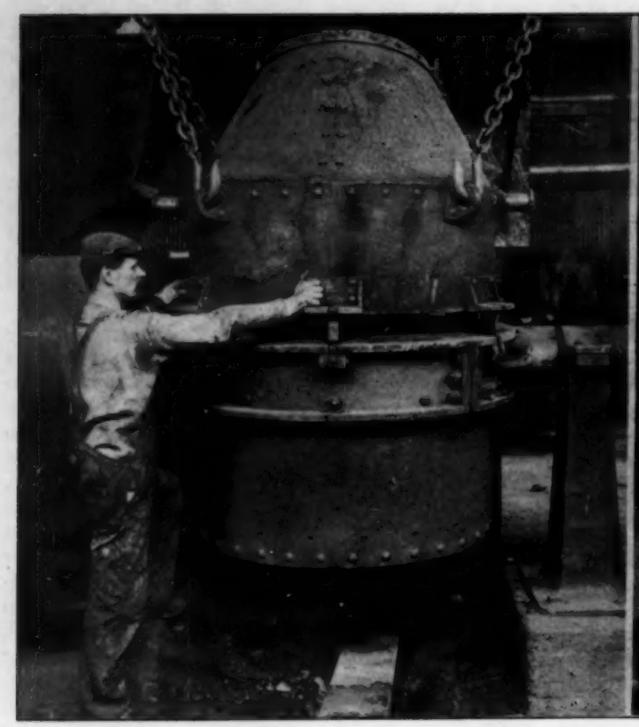


FIG. 2—SHOWING HOW TWO-PIECE CONVERTER IS PARTED ABOVE TRUNNIONS

FIG. 3—REPAIRS TO LINING ARE SIMPLIFIED BY TWO-PIECE CONSTRUCTION

every department may be similar physically, but as long as they are under separate managements, different ideas of operation will be reflected by the methods employed in making castings. And that is the reason that there is a "story" in every foundry.

Making Converter Steel

The steelmaking process at the Blackwood foundry is interesting. The melting equipment is composed of two specially designed cupolas of the blast furnace type and two 2-ton side-blow Tropenas converters of the Blackwood two-piece type. The cupolas which are 36 and 56 inches inside diameter, respectively, are charged with a mixture of approximately 65 per cent scrap and 35 per cent pig iron. Thirty per cent of the scrap is made up of the risers, heads, etc., from the cleaning room, and the remainder is a high grade of shell discards. The cupola is operated so that approximately 8 tons of metal are always in the process of being melted, this amount being sufficient for four 2-ton charges for the converter. A blower made by the P. H. & F. M. Roots Co., Connersville, is connected in series to the cupolas, and may supply the blast to either or both as desired.

A full charge of metal is tapped from the cupola into a 3-ton ladle handled by a 5-ton electric traveling crane built by the Toledo Bridge & Crane Co., Toledo, O. After the metal is blown it is poured into distributing ladles and delivered to the molds by hand.

The efficiency of the melting equipment is greatly increased by the special design of the cupolas and converters and by the system of operation. By constantly maintaining a sufficient amount of metal in the cupola to provide for four blows of the converter, the heating value of the coke is considerably increased, enabling the use of a one-to-seven ratio of fuel to iron.

FIG. 4—SPRUES, GATES AND RISERS ARE REMOVED BY MEANS OF ACETYLENE CUTTING TORCHES

Advantage of Two-Piece Converter

The two-piece arrangement of the converters greatly facilitates relining and permits the use of one converter continuously for a full day while the other is being relined. As shown in Fig. 2, the two-piece converter is similar in all respects to the ordinary bessemer unit except that the shell is in two parts, the line of division being a ring just above the trunnions. This arrangement makes it possible to remove the upper part

of the shell from the lower half, thus making the interior of both sections accessible for relining. A detailed description of the two-piece converter, which is an improved type of the Tropenas unit patented by A. F. S. Blackwood, appeared in the February, 1913, issue of *The Foundry*. At the present time from 20 to 22 blows are taken from the converter each day.

As I watched the workmen in the act of carrying hot metal from the tilted converter to the molds in small hand ladles I was again reminded of the "all the same" arguments of my friend Marshall. Here, evidently, the method of distributing metal employed in the typical foundry was being followed to the letter. Just as I was about to dismiss the pouring process as an impossible feature for my story my attention was called to a couple of brackets riveted to one of the building columns. As their purpose was being outlined to me, I had visions of again upholding my contention with the salesman, for the brackets are the forerunners of a system of metal distribution that will mean a remarkable saving in time, labor and equipment.

FIG. 6—UNUSUAL VIEW OF INTERIOR OF ROTARY TABLE SAND BLAST CHAMBER

A Unique Pouring System

Under the present system of pouring, the converter is merely a ladle during the time the metal is being carried from it to the molds. When the four heavy brackets situated at convenient points in the foundry are installed, the entire blow from the converter will be poured into a large tea-pot ladle carried on the hook of the 5-ton crane. This ladle will be carried to one of the four brackets, which is at the proper height from the floor to bring the spout at a point convenient for pouring into the small distributing ladles. This arrangement will enable the converter to empty its charge in less than a minute. The slag can be run out, a new charge deposited from the cupola, and under favorable conditions, the bessemer unit be placed in position for blowing five minutes after the last melt has been discharged. Experienced foundrymen will have already concluded that this method also releases the crane for other duties as soon as the tea-pot ladle is placed on one of the brackets.

Heating Relined Ladles

This plan naturally necessitates the use of a larger number of ladles, and in order to facilitate their heating an ingenious apparatus has been devised. Cast frames about 5 feet square are held in a vertical position and lined with fire brick. A hole of sufficient size to allow the entrance of

FIG. 5—VIEW OF THE MOLDING FLOOR—THE SMALLER MOLDS IN THE FOREGROUND ARE MADE ON SQUEEZERS AND THE LARGER ONES AT THE END OF THE BUILDING ARE MADE ON ROLL-OVER JAR-RAMMING MACHINES

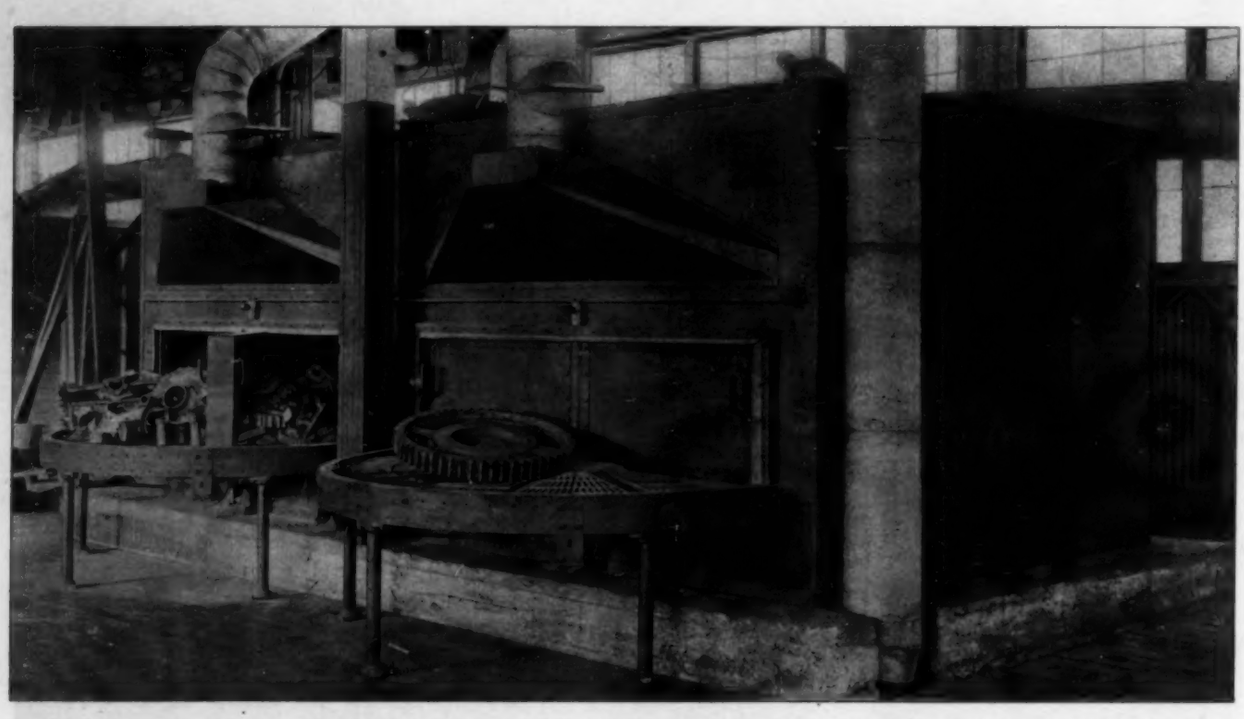


FIG. 7—CASTINGS TOO LARGE FOR THE SAND BLAST BARREL ARE CLEANED ON THIS ROTARY TABLE MACHINE—UNUSUALLY LARGE CASTINGS ARE CLEANED IN A SAND BLAST CHAMBER

the flame from an oil torch is left in the center, and a torch with oil and air connections is fastened to the back of the vertical frame. The ladle to be heated is placed in front of the frame with the edges tight against the fire brick. When the torch is lighted, the flame is directed against the bottom of the ladle, and since the fire brick in the frame makes the ladle an enclosed chamber, practically all of the heat is expended in heating the lining.

Molding sand is handled in an unusual manner. Castings are shaken from the molds as soon as possible after they are poured. The old sand is cut over by a sand mixing machine built by the Sand Mixing Machine Co., New York, and the excess which is not used for backing is carried to a dry pan made by the Frost Mfg. Co., Galesburg, Ill., in trucks furnished by the Lakewood Engineering Co., Cleveland, drawn by a storage battery tractor built by the Automatic Transportation Co., Buffalo, N. Y. The sand is carried from the molding floor to the dry pan at night, and this allows time for the tractor batteries to be charged during the day while the tractor is not in use. Facing sand is made up from three parts of new to eight parts of floor sand, and calculated on a monthly basis for molding and core sand, the ratio of new sand to old is approximately one to six. The sand is sifted through gyratory riddles made by the Great Western Mfg. Co., Leavenworth, Kan., and is rammed by pneumatic rammers manufactured by the Chicago Pneumatic Tool Co., Chicago. Compressed air is furnished by an Ingersoll-Rand compressor situated in a small building which houses a Westinghouse motor-generator set, together with transforming apparatus.

FIG. 8—LARGE ANNEALING FURNACE—ALL CASTINGS ARE SUBJECTED TO A HEAT OF 1,600 DEGREES FOR ONE HOUR, THE TEMPERATURE DROPPED TO 1,500 DEGREES, AND THE CASTINGS DRAWN OUT

switchboard, and the usual accessories.

Small-sized castings are molded on a battery of 18 roll-over and pattern-draw squeezers built by A. Buch's Sons Co., Elizabethtown, Pa., and the larger molds are made on two combination jar-ramming, turn-over, power-draft machines manufactured by the International Molding Machine Co., Chicago, and a similar machine built by the Tabor Mfg. Co., Philadelphia. Two smaller roll-over, jar-ramming machines manufactured by each of the two last named companies are used in the core room. The molds are dried by oil torches made by the Hauck Mfg. Co., Brooklyn, N. Y., and the Mahr Mfg. Co., Minneapolis, Minn.

Small cores are made in a Hammer core machine built by the Brown Specialty Machinery Co., Chicago, while the large ones are made in core boxes by hand. Small cores are baked in two gas-fired Crawford sectional ovens built by the Oven Equipment & Mfg. Co., New Haven, Conn. A Connersville blower provides the blast for these ovens. Large cores are baked in a double-chamber, coke fired oven designed and built by the Blackwood company. Angle irons fastened on the interior walls of the oven at convenient heights form supports upon which the metal trays carrying the cores are placed.

Cleaning Room Operations

Every casting is shaken from the mold and carried to the cleaning room before the completion of the day's work in the foundry. The sequence of operations in the cleaning department is as follows: Sand-blasting; cutting off sprues, risers, gates, etc.; first inspection; electric welding; grinding; second inspection; annealing; tumbling; and third inspection. If the third inspection reveals defects that may be overcome by welding, the casting is sent back to the welding room, and from there it passes through all of the subsequent operations again.

The sand-blasting equipment consists of a large sand blast barrel furnished by the Brown Specialty Machinery Co., Chicago; a twin-chamber rotary-table sand-blast machine, shown in Figs. 6 and 7, and a sand-blast room. Dust from the sand-blasting equipment and from the grinders, tumblers, etc., is blown into dust arresters situated on elevated platforms about 30 feet from the cleaning room. One of the arresters, with accompanying flues from the cleaning room, is shown in Fig. 9. The rotary table machine, sand-blast room, and arresters were manufactured and installed by the Pangborn Corporation, Hagerstown, Md. The three types of sand-blast apparatus accommodate castings ranging in size from one ounce to more than 500 pounds. Small pieces are cleaned in the barrel; medium-sized castings are blasted in the rotary-table machine; and large and bulky castings are cleaned by means of hand-operated, sand-blast nozzle in the sand-blast room.

The castings are trimmed by means of a sprue cutter and acetylene cutting torches, and then, after being inspected, are sent to the welding department for attention. The electric arc-welding apparatus which was manufactured and installed by the Lincoln Electric Co., Cleveland, is enclosed in a room next to the sand-blast apparatus. Blow holes, shrinkage cracks and misruns are repaired by this electric process, after which the rough surfaces of the castings are ground. The grinding equipment consists of six two-wheel floor grinders made by the Safety Emery Wheel Co., Springfield, O., and four swing grinders designed by the Blackwood company. The swing grinders are unusual in that no babbitt is used in their construction, all bearings being of the roller type. The second inspection follows the grinding operation.

All castings are annealed in a large coal-fired annealing furnace built according to a design worked out by the George J. Hagan Co., Pittsburgh. A charge of castings is left in the furnace for a period of one hour at a temperature of 1,600 degrees, the temperature is then reduced to 1,500 degrees, and the castings are drawn from the furnace at this temperature. While still hot, they are placed in the three 72-inch exhaust tumblers made by the Whiting Foundry Equipment Co., Harvey, Ill. The annealing furnace temperature is indicated by a Brown electrical pyrometer made by the Brown Instrument Co., Philadelphia.

The Blackwood Steel Foundry Co. is an Ohio corporation capitalized at $400,000. The officers of the company are: A. F. S. Blackwood, president; J. E. Galvin, vice president and secretary; George S. Stage, treasurer. The product of the plant consists of a great variety of medium size castings, a large percentage of which are used in the automobile industry.

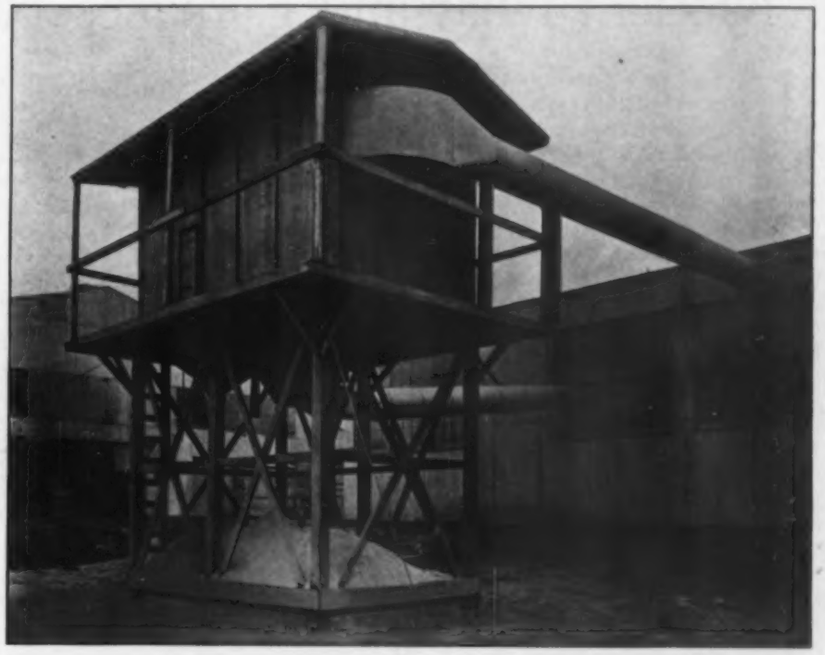
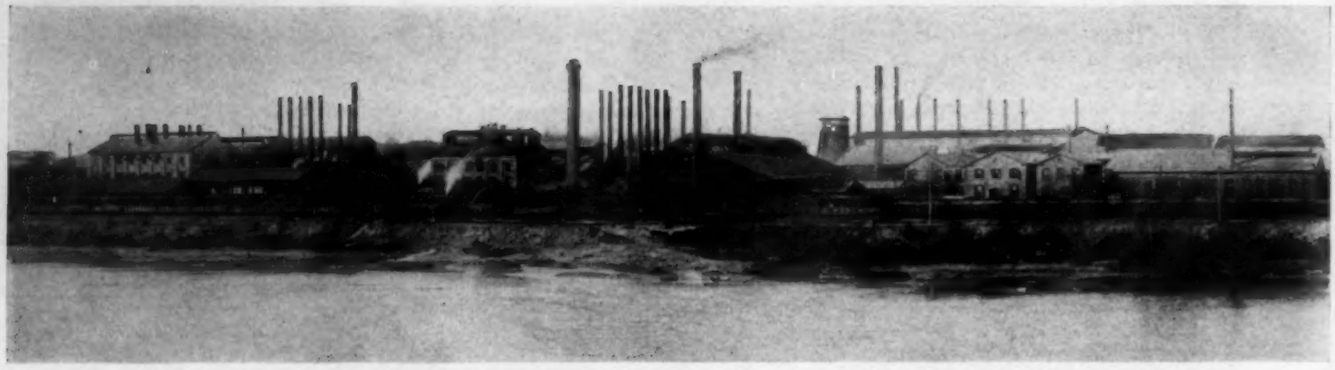


FIG. 9—DUST FROM THE SAND BLAST AND FROM THE TUMBLING BARRELS, GRINDERS, ETC., IS BLOWN TO DUST ARRESTERS OUTSIDE THE BUILDING

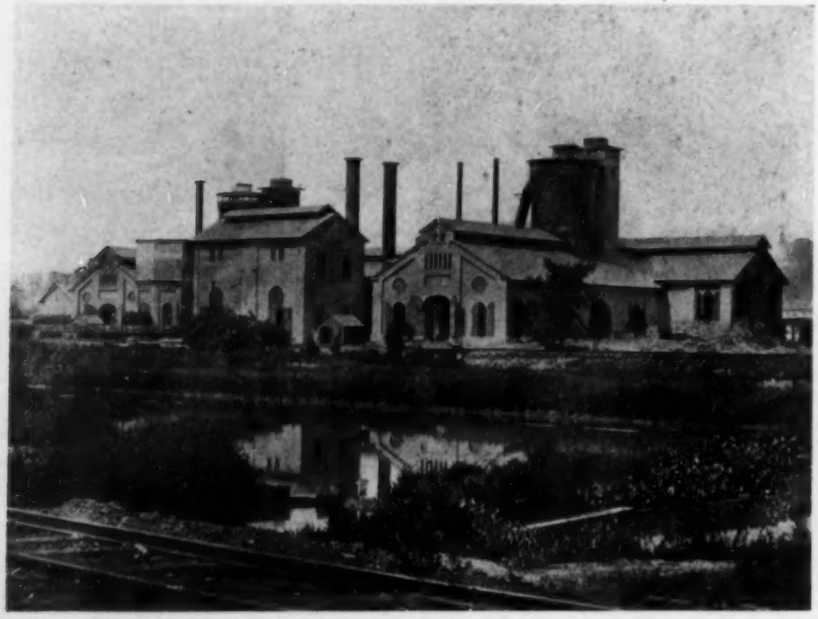
Artillery Ammunition

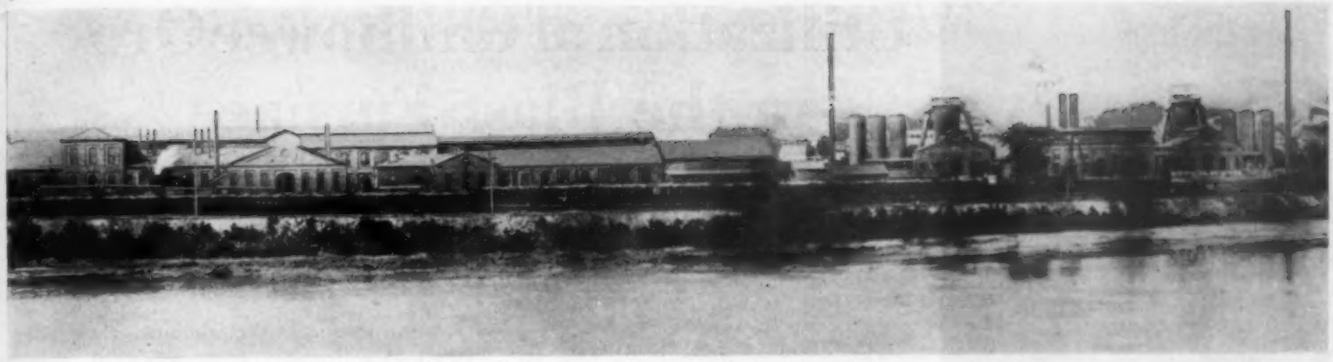
A comprehensive book entitled *"United States Artillery Ammunition"*, was recently published by the McGraw-Hill Book Co., New York, with the idea of giving shop men, engineers and manufacturers a more accurate knowledge of the sizes, tools and gages necessary in the production of the common United States shells and cartridge cases. Many illustrations are included in the booklet, but probably its most prominent feature is the fact that every important machining operation is shown in a separate drawing. The material for the book was collected under the direction of Ethan Viall, managing editor, *American Machinist*.



Modern Mills and Furnaces Rise Where Pioneers

MANY of the old time works which have played their part so prominently and well in the upbuilding of the United States to the position of leader in iron and steel industry of the world have succumbed to the march of progress. In their rehabilitated and enlarged form today few of them bear more than a vestige of their former rank and glory. One of the most illustrious and historic of the steel plants of the country which now is in the process of reconstruction along those lines called for by present day production, is that of the Pennsylvania Steel Co. at Steelton, Pa. Here was established the first commercial bessemer steel plant in the United States. Here likewise was produced the steel from which were rolled the first steel rails on order in this country. The Pennsylvania Steel Co., was organized at Philadelphia, June 25, 1865, with a capital of $200,000 by Samuel Morse Felton, J. Edgar Thompson, president of the Pennsylvania railroad, and others, for the manufacture of steel rails. Mr. Felton who had already won for himself a notable place in the world of railroad construction and management having served as an engineer and subsequently as president of eastern railroads. He was bade made president of the new company. The Susquehanna valley was picked for the location of the works. The exact site was three miles from Harrisburg. Here work for the foundation for the new plant was instituted on May 1, 1866. The mill then took the name of Steelton. The first heat by the bessemer process was obtained May 25, 1867. The original steel plant consisted of two 7-ton converters. Small ingots were cast and rolled by the Cambria Iron Co. into the first steel rails to be manufactured to a definite order in the United States. These rails were delivered to the Pennsylvania railroad. The rail mill of the Pennsylvania Steel Co. was completed in May, 1868. The use of small ingots did not long continue. Large ingots were cast and these were broken down under hammers to the desired rail size. The construction of the blooming mill was carried out in 1876 and as the open-hearth process of steel making then was coming into some prominence, two 5-ton furnaces were built. These soon were replaced by two 20-ton units. In the meantime the two converters of the bessemer plant proved inadequate





First Made Bessemer Steel on Commercial Basis

and they were supplemented in 1881 by three 8-ton vessels.

Pig iron first was imported from England. In 1872 a 60 x 14 foot stack was built. A second furnace, 55 x 11 feet, was added soon after. A third 80 x 20 feet in 1874-76 and two others, 70 x 18 feet, were installed in 1884

The steel output of the Steelton works was 1000 tons annually in 1867. In 1889 it was 255,000 tons. Today it is 1,500,000 to 2,000,000 tons. Rail production grew from 550 tons in 1867 to 145,000 tons in 1889, and to about 300,000 tons at present.

In the accompanying views are shown the Steelton works as they appeared in years long past. The panorama of the entire plant stretching along the banks of the Susquehanna has greatly modified. The historic furnaces, mills and buildings rapidly are being replaced and rebuilt according to modern design and requirements. The center view on the left hand page shows the old bessemer converter plant. The striking manner in which blast furnace design of 40 years ago contrasts with the trim, mechanically-served unit of today is furnished by the lower left hand view. On the opposite page the exterior appearance of the open-hearth, blooming mill, hammer and rail mill department is given. A 10 gross ton ingot cast by the Pennsylvania Steel Co. for the Philadelphia Centennial and the type of the industrial locomotive of years gone by also are shown. These illustrations have been made from photographs from a private collection of Richard Peters Jr., Rogers & Brown & Co., Philadelphia, who is a nephew of E. C. Felton, former president of the Pennsylvania Steel Co.

Utilization of Chilhowee Ore in the Blast Furnace

BY F. M. McCLENAHAN

Experimental Blast Furnace for Testing Chilhowee Ore

IN AN article by E. C. Eckel in *Manufacturers' Record* for Sept. 14, 1916, the total iron ore reserve of the South was estimated as 2,500,000,000 tons. However, there is little doubt that this estimate did not include a valuable deposit of Clinton-Rockwood fossil ore in Blount county, Tennessee, where there are many millions of tons. The ore belongs to the Clinton-Rockwood formation and is bordered on both sides by Knox dolomite in large strata, interchanged with shale and some sandstone. Its cleavage is fairly regular, and it breaks into rhombohedral blocks when struck with a hammer.

The volume of the ore is enormous, and its accessibility is excellent, since the topography of that part of the country would lend itself readily to railroad construction and existing railroads are within a short distance from the veins.

Physical Qualities of Ore

The physical quality of the ore varies somewhat with the conditions surrounding its location. Where the vein has been sheltered for ages from excessive drainage, it is dark-red. Where it has been exposed to surface drainage and seepage of surface waters, it is porous to a greater or less extent. It is decidedly an aqueous sedimentary deposit.

The chemical quality of the ore may be judged from the comparative analyses of representative Red Mountain (Alabama), Mayari (Cuban) and Chilhowee (Blount county, Tennessee) ores, as shown in Table I.

An optical inspection of the residues from hydrochloric acid solution of the Chilhowee ore indicates a kaolin-like material practically free from silica. Apparently the relation of alumina to silica in the ore is one of chemical union, rather than one of mechanical mixture.

The samples were all taken from a level above drainage. It is probable that limestone and possibly some dolomite would be found commingled with the ferrous and silicious material of the ore when the veins were inspected below drainage. But, if the observation of the Red Mountain deposits is taken as a criterion, the alkaline earth content of the ore becomes constant below drainage to the deepest limit of the deposit. In the Birmingham region, the zone of constant composition is reached about 300 feet from the outcrop downward along the slope of the dip. Although the iron content may give place, to some extent, to lime and magnesia, yet so will the aluminous and silicon content of the ore, and in like proportion. It is not probable that the proportion of alumina and silica to iron will change from the outcrop to the apex of the syncline. Any entrance of limestone that may occur simply brings the ore more nearly to the condition of a self-fluxing ore. Consequently, the metallurgical problem of the ore has to do with an efficient disposal of the aluminous and silicious portion of its contents.

In Table II, J. E. Johnson Jr. gives data with respect to some experiments tried out under his supervision to determine the action of alumina in slag.

Johnson maintains that alumina acts neither as a base nor as an acid, but as a diluent affecting the viscosity of the slag and not its chemical nature. In the above cases, the fluidities of the slags were practically the same, as are also the ratios of the last column. But the alumina content varies greatly.

Table III is a comparison of Mr. Johnson's data together with analytical results on a typical slag produced at Sparrows Point, Maryland, from the highly aluminous Cuban ores, together with assumptions of slags theoretically produced from Chilhowee ore, using, on the one hand, limestone as the flux and Mr. Johnson's ratio of 1.50, and, on the other hand, the dolomite flux practice of the Bethlehem Steel Co. at Sparrows Point.

Slag Burden

Leaving out of consideration the slag-forming materials in the coke used, the slag burden of the furnace using Chilhowee ore, when employing a practice similar to that of the Bethlehem Steel Co. at Sparrows Point, would approach 1400 pounds slag per 1000 pounds pig product. This is somewhat in excess of that of present American practice. The metallurgical availability of the ore is assured, since its total required furnace burden, using dolomite as the flux, would probably not exceed 4600 pounds per 1000 pounds of 95 per cent pig, and also since it lies not far distant from the enormous coking coal deposits of Eastern Tennessee and is 200 miles nearer Ohio and north Atlantic markets than is Birmingham.

The distribution of the components of a furnace using this ore, as com-

Table I

Comparative Analyses of Ores

	Elements in Per Cent								
	Fe	SiO_2	Al_2O_3	$CaCO_3$	S	P	Mn	Cr	Ni-Co
Birmingham (hard)	35.50	14.00	3.00	28.60	.....	0.3	....	....	....
Republic (soft)	45.20	21.37	5.57	3.01	.....	.....	....	....	....
Sloss-Sheffield (soft)	41.37	16.08	8.88	10.50	.....	.....	....	....	....
Mayari (nodulized)	54.30	3.00	13.85	.....	0.079	0.023	1.06	1.90	0.87
Chilhowee (ignited)	46.91	17.42	14.33	.....	0.036	0.200	0.14	....	....

From a paper contributed by the Mellon Institute of Industrial Research, University of Pittsburgh.

Table II

Composition of Slag

Elements in Per cent

	Al_2O_3	$Si\ O_2$	CaO	$\frac{CaO}{Al_2O_3+SiO_2}$	$\frac{CaO+Al_2O_3}{SiO_2}$	$\frac{CaO}{SiO_2}$
Virginia	6.5	36.0	54.0	1.27	1.68	1.50
Lake	13.5	33.0	50.0	1.08	1.92	1.51
Experimental (24 hours' run)	36.0	24.7	36.8	0.59	2.90	1.44

pared with that of the components of typical burdens successfully maintained at furnaces in the Birmingham district, is shown in Table IV.

During the past winter some carefully worked out experiments were carried on at the Mellen Institute to determine the factors entering into the proper utilization of the Chilhowee ore, and, incidentally, to indicate the practicability of this method in handling Chilhowee ore as well as the other ores.

The fluxing action of sodium chloride on silicious material has been well recognized in the pottery industry and its application to the smelting of iron ores in a blast furnace was frankly conceded to be attended with probable detrimental corrosion of the furnace lining. For that reason, the selection of a properly resistive lining for the furnace was early recognized as of prime importance.

A small testing furnace was built and a number of brick of selected brands and of standard market quality were submitted to the full corrosive action of sodium chloride at a temperature somewhat above 2800 degrees Fahr., for a period of from 2 to 3 hours. The source of heat was a combination of coke and natural gas with air-blast. The sodium chloride was stoked in with the blast. The brick tested were manufactured by the Harbison-Walker Refractories Co., Pittsburgh. It was found that "Hearth and Bosh" brick were most resistive. The surface of the bricks was barely glazed, but, except at the hottest place in the furnace, which had a temperature probably above 3000 degrees Fahr., there was no real corrosion or flow to the surface of this brick.

For this reason "Hearth and Bosh" machine-made and full-burned brick were used in the experimental blast furnace subsequently erected at the Mellon institute. The accompanying illustration shows the construction of this furnace.

Description of Furnace

The shell of the furnace from the tuyere level to the top was about 70 inches. The shell itself was made up of plates of galvanized iron, 1/16 of an inch in thickness. Nine peep-holes are arranged at regular intervals from the level of the tuyeres to the top of the furnace. During operation, these holes were kept closed with asbestos and fireclay plugs. Twelve radially placed tuyeres with a diameter of 1 inch and an outlet ½ inch supplied the blast. They were supplied with air from a 6-inch bustle pipe, which, in turn, was supplied with air from a motor-driven blower. The outlet of the blower was a 3-inch iron pipe, which passed to a coil of the same pipe encased in a brick stove. The stove was gas-fired, from which the blast passed directly to the bustle pipe. The bustle pipe and tuyeres were made of black iron and were coated with asbestos, as was the stack, to prevent excessive radiation.

The inwall was supported by a cast iron ring, which rested on angle irons supported by iron pipe columns set in concrete bases. The bosh was supported by another cast iron ring, bolted securely to the mantle ring. The hearth was designed to be removable from time to time; it was forced up against the base of the bosh with a screw jack and then supported by wedge brick. A sprinkling apparatus was at first installed, but was early discarded and the asbestos coating was put on.

Aside from the study of the use of sodium chloride for the fluxing of this ore, and obtaining the resultant slags, and iron samples, the examination of the actual quantitative corrosion of the lining of the furnace was the most important problem. The tabulated measurements of the free space diameters before each succeeding try-out, shown in Table V, serve to indicate the region of the greatest corrosion and where it was not appreciable. The numbers given to the various peep-holes begin in their order from tuyere level and go upward to the top of the furnace.

It will be noted that the inwall diameters remained constant and, therefore, there was no measurable corrosion. An inspection of the lining showed but a bare glazing in the region of the mantle. The upper part of the bosh was glazed, but showed no alteration due to corrosion. In the lower part of the bosh valleys were formed between the brick, the faces of which were worn away appreciably.

From these observations it is concluded that "Hearth and Bosh" brick are sufficiently dense and chemically resistive to the action of sodium chloride in a blast furnace at all points, except where the temperature is the most intense in the immediate vicinity of the tuyeres.

It is thought that the substitution of graphite or carbon brick or graphitized "Hearth and Bosh" brick, at least in the lower belt of the bosh and the upper belt of the hearth, would obviate a destructive corrosion of the lining by sodium chloride. The bathing of the face of such a lining by the down-flow of liquid slag would shield the same from wearing away by oxidation in the tuyere zone.

The theory of the action of the sodium chloride in the furnace may

Table IV

Burden Components and Product

	Raw materials in pounds			Product in pounds	
Ore	Ore	Flux	Fuel	Slag	Pig (95 per cent)
Chilhowee	2164.0	1052.0	1400.0	1361.9	1000.0
Red Mountain (hard)	2700.0	.....	1400.0	952.2	1000.0
Red Mountain (hard)	3028.5	.....	1224.0	991.0	1000.0
Red Mountain (hard)	2817.0	.....	1168.0	746.8	1000.0

Table III

Comparison of Slag Analysis

	Practice					
		Johnson's			Chilhowee	
Elements	Virginia	Lake		Sparrow	Assuming Ratios of	
in per cent	Ore	Ore	Experimental	Point	Johnson	Sparrow Point
Alumnia	6.5	13.5	36.0	25.27	24.76	22.10
Silica	36.0	33.0	24.7	24.61	30.10	26.98
Lip	54.0	50.0	36.8	36.05	45.15	40.30
Magnesia	....	....	....	10.63	.....	11.60

be briefly stated as follows: The salt is blown into a rapid-oxidizing region whose temperature is above 3000 degrees Fahr. The sodium chloride is dissociated, part of the sodium being oxidized. The vaporized oxide of sodium combines with the silicious material of the descending charge, forming sodium silicate as one of the products. The sodium silicate unites with other silicates to form the crude slag of the furnace, and incidentally dissolves alumina and other materials. The dissociated chlorine is taken up by the slag.

In this way a proper fluidity of slag may be produced by regulating the supply of salt to the interior of the furnace. The control of this supply may be made perfect by suitable mechanical devices. Being vaporized, the furnace space otherwise occupied by fluxing material is saved and the plant is capable of a greater daily production of pig with the same outlay of money for labor and invested capital. Also, there is an economy of fuel on account of the volatility of the flux.

Indeed, so much economy of space and fuel may be obtained by the use of sodium chloride as a flux that Chilhowee ore, whose burden is slightly disadvantageous when dolomite is used, may be made an active and powerful competitor of the best ores. It is believed that this advantage of sodium chloride as a flux is not limited to Chilhowee ore, but may be used with Cuban, Red Mountain or Mesabi ores.

In Table VI, the dolomite furnace burden for Chilhowee ore was calculated from analagous practice at Sparrows Point. The sodium chloride furnace balance was calculated from the known analyses of the ignited ore. The third furnace balance was the ratio given by a responsible official of an iron-producing company in the Birmingham district. The fourth is a typical balance secured from literature, and the fifth is a ratio obtained from responsible parties using Cuban ores. All ratios were reduced to a common basis of production of 1000 pounds of pig, for the sake of intelligent comparison.

Table V

Corrosion of Inwalls

Location	Peep holes Number	Height above tuyeres in inches	Diameter in inches at time of blast number 1	2	3	4
Inwall	9	67.5	12.6	12.6	12.6	12.6
	8	55.5	14.6	14.6	14.6	14.6
	7	38.5	16.6	16.6	16.6	16.6
	6	31.5	18.6	18.6	18.6	18.6
	5	19.5	20.4	20.4	20.4	20.4
	4	13.5	20.5	20.5	20.5	20.5
Bosh	3	9.0	19.5	19.5	19.7	19.5
	2	5.0	17.0	17.4	17.5	18.8
Hearth	1	0.0	15.0	No measurements made		

Since sodium chloride vaporizes and occupies the pores of the ore, the stock space of the furnace occupied thereby, is negligible and that of the chargings, in this case, would be the sum of the volumes of the ore and fuel. Certain comparative ratios are given in Table VII to indicate metallurgical advantage or disadvantage each smelting condition may have in actual practice. The space ratios were calculated from the following weight assumptions:

1 cubic foot of iron ore weighs 224 pounds.

1 cubic foot of limestone or dolomite weighs 168 pounds.

1 cubic foot of coke weighs 26.3 pounds.

In these ratios, efficiency is inversely proportional to the magnitude of the numbers. To interpret these figures, let us consider the Chilhowee ore being smelted with dolomite as the flux. Compare it with Red Mountain (hard) and Cuban (nodulized). Although it requires less ore per unit of pig than Red Mountain, yet it demands much flux, while the latter is self-fluxing and, the fuel quotation being the same in each case, the burden on the furnace and the stock space in the furnace are somewhat greater. Therefore, the dolomite fluxing of this ore is not so efficient as the smelting of self-fluxing Red Mountain ore. Assuming that the raw materials and labor expense are on a parity, Birmingham Red Mountain pig may be produced slightly cheaper in Birmingham than Chilhowee pig may be produced in eastern Tennessee. But the latter has the advantage of being 200 miles nearer the northern and eastern markets. For this reason, it is safe to predict that Chilhowee ore may be smelted in eastern Tennessee and delivered to Ohio for eastern markets on competitive equality with Red Mountain, Alabama, ore.

Not being so rich in iron content, more is required of the Chilhowee ore than the nodulized Cuban ore to produce a unit of pig iron. Since the burden of the furnace is greater, more dolomite is required and consequently more fuel is necessary in the smelting of the former than of the latter.

However, Chilhowee ore contains no chromium, nickel or cobalt to interfere with the general utility of the pig iron product, and the cost of the raw materials, laid down at a furnace in eastern Tennessee, would be very much less per unit of pig.

In comparison with lake ores, the

(*Continued on page 351.*)

Table VI

Ratio of Furnace Balances

Ore—Grade of	Raw material in pounds Ore	Flux	Fuel	Product in pounds Slag	Pig 95 per cent
Chilhowee	2164.0	1052.0 dolomite	1400.0	1361.9	1000.0
Chilhowee	2164.0	144.3 salt	844.7	963.8	1000.0
Typical Red Mountain	2700.0	.....	1400.0	952.2	1000.0
Typical Lake Ore	1767.0	477.8	941.2	509.4	1000.0
Typical Cuban	1625.0	812.5	812.5	774.0	1000.0

Table VII

Comparison Ratios of Various Ores

	Ore	Flux	Stock Space	Fuel	Weight of Ore	Flux	Burden	Slag	Pig
1.	Chilhowee	Dolomite	1.65	1.72	1.31	7.22	1.47	2.67	1.00
2.	Chilhowee	Sodium Chloride	1.00	1.05	1.31	1.00	1.00	1.89	1.00
3.	Red Mountain (hard)	Self-Fluxing	1.56	1.72	1.66	....	1.30	1.87	1.00
4.	Lake (Gogebic)	Limestone	1.11	1.15	1.09	3.31	1.01	1.00	1.00
5.	Cuban (nodulized)	Dolomite	1.09	1.00	1.00	5.63	1.03	1.52	1.00

Research Work in the Iron Industry

A Brief Outline of the Investigations Conducted by the United States Bureau of Mines in the Interests of the Manufacturers and Consumers of Iron and Steel Products

AS IRON is the most important of all metals, and one in which this country is the leading producer, with 40 per cent of the world's supply to its credit, it may seem that the bureau of mines has given the iron industry scant attention in comparison with other studies. However, this seeming oversight has been due chiefly to a realization of the magnitude of the problems involved and the inadequacy of present appropriations to make more than a small start on the work. The iron and steel industry is predominantly in the hands of large industrial interests fully able to work out their own technical problems. It has been felt that there was not the same urgency in proffering government assistance in this direction as there has been in the industries representing smaller and more scattered control and individual effort.

Investigation of Safety

In conformity with the bureau's general policy of promoting safety and welfare in the industries which it touches, it has been making a study of accidents at iron and steel plants with a view to determining the principal causes of such accidents and to developing equipment and practice to lessen them.

Since 1906 a few firms have been actively engaged in accident reduction in their plants, and since 1910 the iron and steel industry has been increasingly putting more and more insistance upon the elimination of dangers and the lessening of the accident risk in the occupation. In 1909 and 1910 the federal department of labor conducted an intensive investigation into the accidents and accident prevention in the industry. The report of the investigation was statistical and it showed unmistakably the ordinary causes of accidents characteristic of blast furnaces and steel works. A considerable proportion of the accidents were caused by strictly occupational hazards, among which asphyxiation from gas, burns from cinder and hot metal, and injuries from explosions, breakouts and slips in the furnaces are typical of the industry.

On account of the growth and expansion of the iron and steel industry and of the industries which depend upon an abundant supply of iron and steel, there arose an urgent need for greater economy and output in the operation of the blast furnace. The raw materials for the manufacture of iron must needs remain iron ore and coal; and with the exhaustion of the higher grade ores the industry is becoming confronted with the problem of profitably working leaner ores.

The first phases of these investigations, the fluidity of blast furnace slags, has for many years been the subject of much speculation and theoretical deduction by operating men and scientists. Prior to the present investigations there had been no reliable conclusions drawn because of the utter lack of experimental data relating to the problem.

Year Book to be Issued Soon

The accompanying article is an abstract of a chapter entitled "General Study of the Iron Industry" in the year book soon to be issued by the United States bureau of mines. The book will be devoted to a review of the many investigations conducted by the bureau. In the iron and steel industry the study of the viscosity of slag, safety and welfare in steel works and corrosion of metals has been consistently carried on by the bureau. The accompanying article is published in THE IRON TRADE REVIEW *through the courtesy of Van H. Manning, director, bureau of mines.*

The function of the slag in the blast furnace is the elimination of undesirable impurities from the pig iron in such a manner that the resulting mass may be easily flushed from the furnace without interrupting the smelting process. This requires that the slag be sufficiently fluid to flow readily from the furnace and that the composition of the slag be such that it can efficiently remove the last traces of impurity from the pig iron. If a slag is so refractory that the blast furnace has to be maintained at an abnormally high temperature, the result is a high consumption of fuel and the possibility of an off-grade product. In addition, the life of the furnace is materially shortened, owing to the temperature employed in smelting. It is the aim of the bureau's slag investigations to furnish metallurgists and furnacemen with reliable scientific data to guide them in their choice of operating factors and to make possible the broadening of present furnace practice to take care of the increasing need of working lean and complex cores.

Economic Losses Due to Corrosion

That the rusting of iron and steel is one of our serious economic and conservation problems is now generally admitted. If we assume an average life of steel of 33 years, the depreciation charge of 3 per cent represents in this country a yearly loss of 1,000,000 tons of product, valued at $30,000,000 to $40,000,000 for the crude or semifinished material alone, exclusive of correlated fabricating costs. The inevitable rusting of steel may be justly claimed to be the bulwarks of the zinc industry, as 60 per cent of the metallic zinc used in this country is for galvanizing iron and steel articles, representing an annual outlay of $20,000,000 in an endeavor to protect metals from inevitable decay. Enormous amounts of paint are used in a like endeavor. About 5,000,000 tons of coal are needed in the production of steel to replace the annual waste and 1,000,000 more for the zinc that is annually lost.

No estimate can be made of the value of the brass, bronze, copper, aluminum, nickel, tin and other metals and alloys used in machine parts, as sheathing, for plating, etc., to protect steel or as a substitute for it in places where it would be used but for its lack of resistance to atmospheric attack. A less definite sum is represented in the capital, labor and material charges for steel construction of a costly design necessitated by the fact that the corrosion of iron and steel destroys any assurance that we may utilize the full measure of the valuable properties of the metal for an unlimited term of service.

The mechanism of corrosion involves research of an electrochemical and metallographic nature. This phase of the problem has of late years received the minor share of attention, partly because the commercial interests are primarily concerned with tests that will prove superiority for their particular product and partly

because the electrolytic theory of corrosion has been rather generally accepted, and in consequence most investigators have assumed that the scientific aspects of the problem were largely solved and neglected to go into the subject.

The electrolytic theory of corrosion is based on simple and well-understood principles; their appreciation to corrosion phenomena involves modifications of detail only. For generation and continuance of electrolytic action certain factors are essential, namely, two dissimilar electrodes, each of which must be an electrical conductor; an electrolyte in contact with both electrodes; a metallic connection external to the cell; and a depolarizer to insure continuity of electrolytic action. Steel subjected to the weather presents the necessary factors. The heterogeneity of surface, chemical or mechanical, furnishes the electrodes of dissimilar character; the moisture of the air, in its natural state or made more active because of dissolved carbon dioxide, sulphurous, or other gases, is the electrolyte; the electrical circuit is completed by the contact of the electrode spots through the body of the steel; the oxygen of the air reacts with the hydrogen liberated at the cathode surface and removes it by formation of water, thus effecting the necessary depolarization. Electrolytic action must proceed if all factors are present; it will cease if any one is withdrawn. At points where the iron forms the anodic electrode it will go into solution, be converted immediately into the hydrate, and be precipitated upon the surface as such, to subsequently undergo transition to the familiar hydrates and oxides, which are more commonly known as rust.

Effect and Kinds of Rust

The investigation relative to the differences in the corrosion of pipe as compared with that if iron exposed to the weather, and the more pronounced pitting common to iron pipe has shown that rust once formed is a factor in the progress of rusting at least equal in effect to those factors universally recognized and is more important than many factors that are subject to dispute because of being attended with detrimental effects of considerable magnitude. It has been found that there is a reversal of polarity according as the rust is wet or dried. As regards rust freshly formed or wet, the underlying iron is electropositive to the surrounding metal, and consequently goes into solution; dried out rust, on the other hand, assumes a negative polarity, which tends to reverse in time after becoming thoroughly wet. This observation has a most vital bearing upon the differences observed in rusting under various conditions, and it accounts satisfactorily for the hitherto enigmatical pitting noticed in water pipes. A most important finding is that fresh wet rust does not act as an electrode, but as a semipermeable diaphragm which makes the underlying iron electropositive, and thus promotes its solution, and that the same effects may be obtained by colloidal or sedimentary substances. This fact is of importance in explaining many effects observed in iron pipe or in iron used under water where no attention was paid to preservatives.

Will Burn Powdered Coal

In Plant of Standard Tin Plate Co., Canonsburg, Pa.—New Mills Installed—Plant Extended

To protect its interests against a threatened shortage of natural gas in western Pennsylvania, the Standard Tin Plate Co., Canonsburg, Pa., is completing plans for the use of powdered coal throughout its plant. A battery of 46 sheet and pair furnaces, two of the nine annealing furnaces and four of the 46 tinning stacks already have been equipped for the use of pulverized fuel. The coal is supplied by the Canonsburg Gas Coal Co., which owns mines in close proximity to the works of the Standard company. The Standard company, it is said will be the first tin plate or sheet manufacturer in the world to use powdered coal throughout its works. The Bonnot Co., Canton, O., is installing the new system.

The Standard company recently completed and now is operating 13 additional tin plate mills, making a total of 23 mills, all of which will be electrically driven as soon as the necessary equipment can be installed. At present, 16 mills are motor-driven. Two 300-horsepower generators, driven by alternating current, furnish power for the operation of traveling cranes and motors of miscellaneous types through the plant. The current is supplied by the West Penn Power Co., Pittsburgh, through its substation at Connellsville, Pa. Two 1200-horsepower direct-connected motors have been installed and each of these drives eight hot mills through Mesta reduction gears. An additional motor of similar type has been ordered to drive the remaining hot mills. Fourteen of the 18 cold mills are driven by a 1200-horsepower motor. The generators and large motors were furnished by the Crocker-Wheeler Co., Ampere, N. J. The boiler house equipment will be dismantled as soon as the entire plant has been electrified.

The hot mill department is housed in a building 100 x 1000 feet. The mills are of standard type. The main building is commanded by six electric traveling cranes, with lifting capacities ranging from 5 to 25 tons, which serve the hot mill and opening departments and the sheet and pair furnaces. The battery of nine annealing furnaces is served by two 15-ton cranes. Powdered coal will be used in all of the annealing furnaces by Oct. 1.

Two black and one white pickler of the 4-arm type, built by the Mesta Machine Co., Pittsburgh, serve the hot mill and cold mill departments. The general machine shop, roll grinding shop, blacksmith shop, box shop, warehouses and shipping rooms are provided with modern equipment. Logemann Bros. Co., Milwaukee, is installing two scrap bundling machines. The B. F. Sturtevant Co., Hyde Park, Mass., is completing a contract for the installation of the heating, cooling and ventilating systems.

The Standard company, which now has an annual capacity of 1,800,000 base boxes of tin plate per year, was organized in 1902. The original plant contained four mills; six mills were added in 1906 and 12 additional mills were put into operation Jan. 6, 1916. Since that time another mill has been installed. Louis Follet is president of the company.

Sulphur Limit

At a meeting of the executive committee of the board of supervising inspectors of the steamboat inspection service recently the sulphur limit in open-hearth steel for boiler plate was raised from 0.04 to 0.05 per cent in order, it is stated, that production may be increased without lessening the safety of this material. Rules regarding the stamping of boiler plates also have been revised to read as follows: "Every iron and steel plate intended for the construction or repair of boilers to be used on steam vessels shall be stamped by the manufacturer at two diagonal corners at a distance of about 18 inches from the edges." Previously the distance specified was 8 inches.

Large Foundry

For Automobile Work to be Built by New Detroit Company

The Barnes Foundry & Mfg. Co., Detroit, recently organized with $2,000,000 capital, has acquired a site of 30 acres in Ecorse on which a large casting plant will be built for the manufacture of automobile cylinders, crank cases, pistons, etc. The property acquired is between the tracks of the Michigan Central and the Detroit, Toledo & Ironton railroads and is south of the property of the Great Lakes Engineering Works. While not directly on the Detroit river, the property is connected with it by a 30-foot canal.

The officers of the company follow: Claire L. Barnes, president; George W. Smith, vice president, and Charles E. Pelton, secretary and treasurer. The directors include the foregoing officers with George A. Landon, vice president of the American Radiator Co.; Dwight B. Lee, general manager of the Motor Products Corp.; Edward A. Loveley, vice president of the Stormfeltz-Loveley Co.; Wm. E. Metzger and Frank G. Smith Jr.

Mr. Barnes, president of the company, formerly was vice president of the Detroit Steel Products Co., and for several years was connected with the Willys-Overland Co., Toledo, O. George W. Smith, vice president, is connected with the Case Threshing Machine Co., Racine, Wis., and Charles E. Pelton, secretary and treasurer, is connected with the Motor Products Corp., Detroit. C. E. McArthur, formerly affiliated with the Western Electric Co., and the International Harvester Co., will be superintendent of the plant.

American Skill to Direct Norwegian Steel Works

The Stavanger Electro-Steel Works, Stavanger, Norway, shortly will install an electrically-operated rolling mill and has engaged the services of an American expert to supervise its construction and installation. The company was established in 1913 and has prospered to such a degree that the proposed extension has become necessary. So far the company's output has been limited to billets and slabs, but with the installation of a rolling mill, it will be possible for it to put out finished rolled products. The American expert has advised that work be pushed on the project as soon as possible in spite of the increased cost of materials and wages. To insure freedom from power difficulties, the company has taken over the shares in a power company located near by. This company in 1900 obtained an 80-year concession for the development of the Jorpeland water course. This course when fully developed can deliver 12,000 to 14,000 horsepower. Of this, 1600 horsepower already is in use and 5600 under completion for the steel works.

Alterations as contemplated will aggregate $777,200, it is said. Following is an itemized list of the proposed expenditures: Rolling mill, electric machinery, buildings, etc., $368,500; electric annealing furnaces, electric generators, etc., $214,400; laboratory extension and equipment, $33,500; shares in power company, $93,800; workers' homes, $67,000. Attempts have been made to secure American manufacturers to bid on the equipment which will be necessary for the new rolling mill.

Contracts Let

For New Ordnance Plants at Madison and Milwaukee

A contract has been let to the Worden-Allen Co., Milwaukee, by the Northwestern Ordnance Co., Madison, Wis., for the erection of a plant of 50,000 square feet of floor space, on a site provided by the Gisholt Machine Co., adjacent to its works. Field pieces of the 4.7-inch type are to be manufactured in the new plant. The Northwestern Ordnance Co. was organized at the request of the United States government by members of the Gisholt Machine Co. and other Madison industrial concerns. C. A. Johnson and H. S. Johnson, president and secretary-treasurer, respectively, of the Gisholt Machine Co., are financing the project.

Likewise organized at the request of the government for the production of guns of the 3-inch type, by representatives of five of the leading machinery and foundry concerns of Milwaukee, the Wisconsin Gun Co. recently let the contract to the Worden-Allen Co. for a 1-story, 130 x 300-foot factory building. Henry J. Wiegand, superintendent of the Cutler-Hammer Mfg. Co., Milwaukee, is in complete charge of the gun works as manager and will supervise the erecting and equipping of the building. W. W. Coleman, president of the Bucyrus Co., is president of the company. As soon as proper legislation has been passed by congress, the government intends to take over both the Madison and Milwaukee ordnance companies for government work.

Half Year Output

Of Pig Iron Announced by American Iron and Steel Institute

During the first six months of 1917, a total of 19,258,235 tons of pig iron were produced in the United States, according to the official statistics just announced by the American Iron and Steel institute. This production is made of 18,874,680 tons of coke, 203,320 tons of anthracite and coke, and 180,235 tons of charcoal pig iron. This half yearly output compares with 19,815,276 tons for the second half of 1916 and with 19,619,522 tons for the first half of 1916. Furnaces in blast on June 30, 1917, numbered 367, with 88 idle, compared with 333 active on Dec. 31, 1916. By grades the yield of the first half of 1917 compared with the corresponding period in 1916, shows as follows:

	1917	1916
Basic	8,620,604	8,830,085
Bessemer and low phos.	7,041,,426	6,839,177
Foundry and ferro-silicon	2,602,448	3,086,410
Malleable	509,982	460,839
Forge	198,914	169,306
Speigeleisen and ferro-manganese	210,432	189,046
Other grades	74,429	44,659
Totals	19,258,235	19,619,522

Of the pig iron made during the first six months of 1917, 13,573,446 tons were for the maker's own use and 5,684,789 tons for sale.

Chilhowee Ores

(*Continued from page* 348)

main advantage of Chilhowee ore, smelted with dolomite, is the cheapness of raw materials and the possibility of a 12 months' uninterrupted operation.

By the use of sodium chloride as the flux for this Chilhowee ore it outstrips its competitors in economy of stock space in the furnace, it is enormously superior to competitors in flux weight, and is at a decided advantage in effecting full economy. In burden comparisons it is the equal of the Gogebic Lake ore, and outstrips Red Mountain ore by 30 per cent. The cost of the sodium chloride, quoted at 3 cents per pound, and 346 pounds per ton of pig, would be $1.04. This is probably a very liberal quotation for the salt, both in amount and in cost.

The conclusion is, therefore, that eastern Tennessee fossil iron ore of the Clinton-Rockwood formation is a valuable natural resource, available for metallurgical development by present accepted methods, and lending itself advantageously to smelting by the comparatively simple process, using sodium chloride as the flux.

Wants Full Grip on Iron and Steel

Pomerene Bill Introduced in Senate Would Give Government Absolute Control Over the Manufacture, Sale and Distribution of Mill and Furnace Products —Proposed Strict Enforcement of Maximum Prices

WASHINGTON, Aug. 14.—Absolute governmental control of the iron and steel industry is proposed by Senator Pomerene of Ohio in one of the most drastic measures ever introduced in congress, which was offered last week just as the senate finally had passed the administration's food control bill. The Pomerene bill, now before the senate committee on commerce, would regulate the production, sale and distribution of iron ore, iron, steel and their manufactures and supplements the food control bill which, now a law, exercises the same power over the coal, coke and oil industries.

The bill first provides that the President, through the federal trade commission, may fix any price for any iron or steel raw or finished product. If the manufacturer or dealer refuses to conform to the President's price or regulation, the latter may commandeer the plant or business. The measure would allow "just compensation" for the use of the plants taken over. If the producer or dealer is dissatisfied with that amount, the government will pay him 75 per cent of the sum and he will have the right to sue for the remainder of what he thinks is just compensation.

Sale to the United States only of the materials and products regulated by the bill is also provided, giving the government the right to resell to whoever it wants and at whatever price it fixes. Only fifteen days are allowed by the Pomerene bill between the time the President or the federal trade commission shall notify any producer or manufacturer of the government's intention to fix a price and the time when such action shall become effective. The government, however, is not given power to alter contracts made in good faith prior to the establishment of the federal price. This drastic act requires that all books and records of all mining, producing, selling and distributing companies affected by the measure shall be subject to investigation by the federal trade commission, under provision in the act creating the commission.

Senator Pomerene has defined the conditions permitting the commission to fix maximum prices for producers. These include the cost of production, the expense of operation, maintenance, depreciation and depletion and a "just and reasonable profit." For the dealer, the cost to him and "a just and reasonable sum for his profit in the transaction" will be allowed. Sale of any iron or steel product, or a quotation at a price higher than that named by the government, will subject the manufacturer or producer to a maximum fine of $5000 or imprisonment for not more than two years, or both if the bill in its present form is adopted. Each separate transaction will constitute an independent offense.

This bill, drawn by Senator Pomerene, who is known as an administration man, would allow the United States to manufacture for and sell to any one, including the nations of the world, at its own figure. By it, the government could make the "fair price" for the producer or seller and might even go so far as to charge more than that and make money for itself. In other words, Uncle Sam could not only become the purchasing agent for the allies, but he could also become their manufacturer. While it was known that the trade commission, now busily engaged in collecting cost data for submission to the President, is having difficulty in reaching conclusions, the Pomerene bill is the first admission of the administration that complete authority is needed actually to perform this task. It is really an admission that the government is now powerless to go ahead with its price-fixing program and that it can do but little until congress gives it power.

The senate committee on commerce to which the bill has been referred is headed by Senator Duncan U. Fletcher of Florida, as chairman. The others of the committee are: Senators Chamberlain of Oregon, Ransdell of Louisiana, Sheppard of Texas, Vardaman of Mississippi, Shields of Tennessee, Martin of Virginia, Bankhead of Alabama, Simmons of North Carolina, Reed of Missouri, Kirby of Arkansas, Nelson of Minnesota, Smith of Michigan, Jones of Washington, Lippitt of Rhode Island, Kenyon of Iowa, Sherman of Illinois, Harding of Ohio, Fernald of Maine, Calder of New York, and Johnson of California.

Straight Line Contracts

Washington, Aug. 14.—War contracts should be in the form of straight purchase-and-sale contracts at fixed prices when fair prices can be obtained; the cost-plus contract may be necessary where the production involves difficult and complicated manufacturing effort or conditions which cannot be clearly foreseen; and in the cost-plus contracts a fixed profit of a definite sum per article should be agreed upon as far as possible, instead of the percentage of cost. These are the recommendations made public by the interdepartmental cost conference which extended over two months.

The conference, organized by Secretary of Commerce Redfield and Burwell S. Cutler, acting chief of the bureau of foreign and domestic commerce, has issued a pamphlet which contains detailed recommendations for contracting officials and is intended to suggest some of the broad economic and equitable points involved in war contracts. On the conference, as now constituted, the war department has 12 members, the navy seven, the federal trade commission three, the accountancy committee of the war industries board three and the food administration one. J. Lee Nicholson, chief of the division of cost accounting of the bureau of foreign and domestic commerce, is chairman of the conference, and H. P. Seideman, of the institute for government research, is secretary.

Rail Prices Are Cause of Inaccurate Reports

Washington, Aug. 14.—Arbitrary establishment by the United States government of $40, open-hearth, and $38, bessemer, as the price for 150,000 tons of 80-pound steel rails to be furnished by American manufacturers for the railroads of France has caused the circulation of unfounded reports which have brought some embarrassment both to manufacturers and to the government. One report in particular is an attack upon the Bethlehem Steel Corp. which, by the rumor, is put in the position of absolutely refusing to roll its proportion of the order amounting to 39,000 tons.

President E. G. Grace of the Bethlehem corporation, has denied his company had refused to produce its allotment and has offered to manufacture the 39,000 tons at a price to be determined later by the government through the federal trade commission. It is understood that companies as well equipped as the Bethlehem Steel Corp. cannot manufacture rails at present under

a figure much more than $10 a ton over that offered by the government. That the Bethlehem corporation is willing to roll the rails at once and to agree on a price later is proved by the fact that it now is furnishing rails for American navy yards under this plan.

This report, which was sent out from New York, only serves to show that the federal trade commission, even clothed with the power given by the Pomerene bill, introduced in the senate last week, probably will have to recommend to the President a grade scale of prices, varying according to the diverse costs of different iron and steel plants. The commission has announced that in about ten days it will have collected sufficient data to arrive at some conclusion as to the cost of producing copper. Such is also said to be the status of the coal production cost investigation.

Secretaries Baker and Daniels, heads of the two government departments purchasing steel for the American government and its allies are said to favor drastic price cutting. Secretary Baker, under whom the rails in question are to be purchased, said he had not heard of any refusal by the Bethlehem or any other steel company to supply the required tonnage. It was admitted in his department, however, that the government's price was under discussion.

Awards Aircraft Plant

Washington, Aug. 14.—Contracts for machinery equipment and structural steel for an airplane factory to be built by the navy department on a site adjoining the aviation field at League Island navy yard, Philadelphia, have been let, according to Secretary Daniels. The valuation and tonnage these contracts involve have not been disclosed, nor have the successful bidders been announced. The plant, complete, is to cost not more than $1,000,000, according to the secretary's announcement. When completed, the plant will employ approximately 2000 men. Completion of the work in 100 days is stipulated.

Priority Bill Leases Free Right to Strike

Washington, Aug. 14.—Provision is made in the priority shipment bill, which became a law last week, that while obstruction or interference with the orderly movement of interstate or foreign commerce is forbidden under penalty of fine and imprisonment, nothing in the measure shall be construed to repeal or modify that section of the Clayton anti-trust law which allows labor to strike peacefully to obtain its demands. Maintenance by the railroads of a central board at Washington, such as the existing railroad war board, is authorized by the priority bill. This board will come directly under Judge Robert S. Lovett, who is in charge of the priority shipments division of the war industries board. It will notify railroads of the President's orders. Under the bill the President is empowered to order, through the interstate commerce commission or such persons as he may designate, that preference be given by common carriers in the transportation of such commodities as he may deem essential to the national defense. The President is given great leeway in prescribing rules and regulations governing shipments.

Arrange Plan to Handle War Labor Questions

Washington, Aug. 14.—Establishment of a labor adjustment commission by the council of national defense to act in disputes of employes and employers engaged in private contracts for government war work and the creation of an interdepartmental committee on the adjustment of wage scales of employes in government plants were two important steps made by the government last week toward the solution of labor problems. The defense council's commission will consist of nine members, three from the employers, three from organized labor and three from the government. The plan has been approved by Samuel Gompers, president of the American Federation of Labor and chief of the labor division of the council. Members of this commission are now being selected. The wage adjustment committee is headed by Franklin D. Roosevelt, assistant secretary of the navy, the other members being Walter Lippman, assistant to Secretary of War Baker, and William Blackman, conciliator in the department of labor.

Jurisdiction is given the labor adjustment board in all disputes concerning wages or conditions of employment in all establishments having contracts with the government, in accordance with the eight-hour law, and shall hear and determine all labor disputes in which more than 1000 workers are directly affected, and may, at its discretion, act in cases where less than 1000 workers are involved. Committees of three, appointed by the commission and representing the commission as constituted, may be appointed from time to time to act in disputes where less than 1000 employes are concerned. Decisions must be made within 30 days for any period not exceeding 60 days after the war and shall be binding upon employers and employes.

The wage adjustment committee in determining wage schedules for the next 12 months, will take the average wage in any community as the basis of that to be paid by the government in its plants in these localities.

One Price Plan May Cut Import Metal Costs

Washington, Aug. 14.—Greatly reduced quotations on ferromanganese, ferrosilicon, tin, tungsten-bearing ores, and other raw materials imported for American iron and steel manufacture are expected to follow the announcement last week of the policy of the war industries board with regard to one price for the United States and its allies. But this lowering of the price of imported materials, it is regarded here, hinges upon the drastic Pomerene measure, introduced in the senate last week to provide for the regulation of the production, sale and distribution of iron, iron ore and steel and their manufactures. If the bill eventually becomes a law, the countries allied with the United States in war must agree upon the same policy. The situation is too indefinite at present to indicate what the European countries would do.

The war industries board declares for the same price for America and her allies on materials used for war purposes, chiefly those of iron and steel manufacture. This was made known in a statement issued by Judge Robert S. Lovett, chairman of the executive committee of the Union Pacific system and a member of both the war industries board and its central purchasing commission. The board did not say, however, it has power to enforce its policy.

The statement issued by Judge Lovett declares for one price for the governments, but is not quite so positive in its attitude toward prices for the American public. The latter question, however, is still in the status given it by President Wilson, that industries "must make the prices to the public the same as to the government," and the industries board quoted the President's statement on that subject.

Prices to the allies are conditional upon the latter, applying the same principle in dealing with their own producers, in selling to us and in selling to each other and upon the limitation of the arrangement to war materials in order to protect American industry. The board says raw materials sold at prices conceded to the government and the allies for war purposes must not be diverted to industry and trade abroad which may come in competition with our manufacturers and producers. The statement says the board will allow "reasonable profit, but shall deny the extortion now exacted for many commodities of prime necessity."

Large Increase

Shown by Both Beehive and By-Product Coke Output in 1916

The production of coke in the United States in 1916 was 54,533,585 net tons, valued at $170,841,197, an increase compared with 1915 of 12,952,435 tons, or 31 per cent in quantity, and $65,337,329, or 62 per cent in value. These figures have been compiled by C. E. Lesher of the United States geological survey, department of the interior, from reports furnished by the operators.

The output of beehive coke was 35,464,224 tons, having a reported value of $95,468,127, an increase of nearly 29 per cent in quantity and 67 per cent in value compared with 1915. The production of by-product coke was 19,069,361 tons, valued at $75,373,070, an increase of 35.5 per cent in quantity and 55.2 per cent in value compared with the previous year. By-product coke represented nearly 35 per cent of the total in 1916 compared with 34 per cent in 1915.

The average number of beehive ovens in operation in 1916 was 65,605, compared with 48,985 in 1915, an increase of 16,620 ovens. The number of active by-product ovens increased from 6036 in 1915 to 6607 in 1916. Six new by-product coke plants, with an aggregate of 603 ovens, began operations in 1916 and had an aggregate output of 708,485 tons of coke. Every important producing state shared in the increase.

Pennsylvania produced 31,279,695 tons of the year's production, Alabama 4,298,417 tons, Indiana 3,489,660 tons, Ohio 1,803,268 tons, Illinois 2,320,400 tons, and Colorado 1,053,553 tons.

Operates New Foundry

The National Castings Co., Marietta, Pa., now is producing gray iron and semisteel castings in all sizes ranging up to 20,000 pounds, the company's new plant having been put upon a regular production basis Aug. 13. The new plant will have a capacity of 50 tons daily and will specialize in close-grained castings.

Plans Large Foundry

The Standard Steel Castings Co., Cleveland, incorporated in 1912 with $125,000 capital, has increased its capital to $1,000,000 and will start work immediately on a new foundry to cost about $250,000 and to be devoted exclusively to the production of cast steel wheels for motor trucks. Miscellaneous castings will constitute the output of the present plant. The melting equipment of the new foundry is to consist of two 3-ton electric furnaces and converters. Ample machine shop equipment is provided so that the new foundry will have a capacity of 400 wheels per day, completely machined. Officers of the Standard company are: President, Julius F. James; vice president and treasurer, Edwin H. James; secretary and general manager, William R. McDonough; directors, in addition to the officers already mentioned, E. W. Moore, P. J. Morgan, M. C. Rosenfeld, R. M. Calfee, J. F. Fogg and B. C. Tucker.

Concrete Ships

Being Experimented With at Montreal—First Craft is Planned

Toronto, Aug. 14.—A movement is on foot among prominent business men of Montreal to undertake the construction of concrete steamships, which it is stated has proved successful in France and Italy. It is claimed that they can be built more rapidly than steel vessels and at less cost. The formation of a syndicate to establish the industry has been promoted by the Atlas Construction Co., and it is understood that the necessary capital has been secured. Plans for the first vessel have been prepared. It will be 200 feet in length and the thickness of the hull will be from 3 to 5 inches. The cost is estimated at something less than $100,000. The venture is largely experimental and should it prove successful several companies are ready to enter upon this line of business.

The plant of the Canada Malleable Steel Range Co., of Oshawa, Ont., which some months ago went into voluntary liquidation, has been purchased by the McClavey Mfg. Co., of London, Ont. John Lang, former superintendent of the Canada Malleable Co., has been engaged in the same capacity.

The fourth annual report of Ontario Steel Products, Ltd., shows net profits of $182,295, a gain of $105,550 over the preceding year and a surplus of $183,497, as compared with $50,183. The sales for the year were the largest in the company's history, and though war orders were a negligible factor, the foreign export trade for commercial products showed a large increase. It is noted that in spite of the increased activity in the motor car business, the output of springs and axles for horse-drawn vehicles, though smaller than some years ago, showed practically no decline as compared with last year.

The plant of the Singer Sewing Machine Cabinet Co., Bridgeport, Conn., employing approximately 500 men, will be discontinued by Jan. 1.

All Toluol

Probably Will be Diverted to Government—Other Products to Allies

New York, Aug. 11.—Owing to the shortage of toluol for war purposes, it now is believed probable that practically the entire supply after the filling of existing French contracts, will be diverted to the use of the United States government. The allies, in such event, probably will confine their demand to benzol and phenol, used in making picric acid, which is the base of the English lyddite and French melenite. The American government will use trinitrotoluol, which is considered superior to the other forms of high explosives, inasmuch as it is safer to handle and slower to explode, yet has tremendous shell shattering power. The production of toluol from March 1 to Oct. 1, 1918, is rapidly becoming sold up, while supplies for delivery before March 1 are exceedingly limited. The sales of toluol to the government continue on the basis of $1.50 per gallon, at producers' plants. A few odd lots have become available for outside buyers, which have been going at about $2 per gallon. The nominal price range is $1.75 to $2. Export demand for phenol is heavy. The output of this material for the remainder of 1917 is practically sold up. Spot is unchanged at 40c to 45c at producers' plants. The contract range is about the same as spot, and is nominal at about 42 to 45 cents per pound. Demand for pure benzol is brisk with prices unchanged at 55 to 60 cents per gallon for both spot and contract. The market for solvent naphtha remains rather quiet, with quotations ranging from 18 to 25 cents for spot and from 18 to 22 cents for futures.

Spot sulphate of ammonia is quoted $4.85 to $5 per 100 pounds.

Coke Oven By-Products

Spot.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.75 to 2.00
Solvent naphtha	.18 to .25

Per Pound at Producers Plant.

Phenol	$0.40 to .45

Per 100 Pounds at Seaboard.

Sulphate of ammonia	$4.85 to 5.00

Contract.

Per Gallon at Producers Plant.

Pure benzol	$0.55 to .60
Toluol	1.50 to 1.75
Solvent naphtha	.18 to .22

Per Pound at Producers Plant.

Phenol (nominal)	$0.40 to .42

Per 100 Pounds at Seaboard.

Sulphate of ammonia	nominal.

British Buyers Scramble for Iron

Increasing Scarcity Keeps Market Very Strong—New Grading of Hematite Formally Adopted—American Rods Advance $5—Foreign Iron and Steel Trade Statistics Show Gain in Exports and Decline in Imports

Bureau of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., July 25, 1917.

ALL branches of the pig iron industry are strong, with the Midlands taking a decided lead. If exports could be carried through in accordance with demand there would be a boom. But the inability to send much iron away steadies the market on the seaboard and in districts like Middlesbrough. It is a long time since the Midland markets showed such strength. No body can get the slightest concession in price. The sole concern of the consumer is to get supplies. He is beginning to fear he will get left, but makers cut down offered. Every smelting firm is refusorders to about one-half the tonnage ing business. The great need in the Birmingham district is for foundry iron which is becoming very scarce. This is largely due to the zeal of the government in getting furnaces to turn on to basic. The foundries devoted to high class castings are being strongly pressed to increase their output. The big naval and shipbuilding program makes great demands upon the high class Staffordshire foundries who use best foundry iron or cold blast. Some of these are in difficulties through scarce and inferior fuel, scarcity of labor and miscellaneous troubles of nearly every kind. The ministry of munitions has this week promulgated a new order embodying certain rearrangements lately effected with regard to pig iron. One effect is to grade hematite a little more elaborately, and the price limit which formerly applied to basic in the Derbyshire, Northamptonshire and North Staffordshire districts is applied to Cleveland and South Staffordshire, the limit being set at £97 6s. This has been in actual operation for some time, so that the order really is a formal one. A weak place in the price arrangement, from the official point of view, is that prices are unrestricted for export, so that shipments are being scrutinized rather sharply. If production could be increased to meet all demands it is rather evident that the makers would benefit very considerably. The values of pig iron exported during June were £776,931 as compared with £665,897 a year ago and for the six months £3,936,-300 as against £3,643,909 last year. In Cleveland sales are for small parcels. Consumers in that district are getting very well served. That district, with rather more shipping available, hopes to do more export business. Scotland is not a very large buyer from Middlesbrough just now owing to the holidays. Business with neutrals tends to decrease. Warrant stock is down to 1137 tons. The hematite market is rather tighter owing to some decrease of production through a furnace being banked for repairs.

Puddling Works Need Men

There is very little new business passing just now. The quarterly meeting added hardly anything to the order books. The fact is that works are as full as they can be, and it is useless to book orders which have no chance of being looked at for months. Some attention has, however, been directed to possibilities of expansion in one direction, namely in the increase in the amount of puddled iron. There are hundreds of puddling furnaces in the district which could be worked, if there were puddlers to man them. One large works alone in Staffordshire has 100 furnaces, which could be started at once if the men were available. The addition to output would be of great value. But the task of finding the men is immeasurably more difficult than it was in the early days of the war.

Large quantities of business are on offer. Stamping sheets are wanted, while rod and strip makers report increased inquiries. The black sheet business is to some extent taking the place of galvanized material, in which hardly anything is doing since sheet bars are so scarce and spelter is so difficult to get.

It is quite likely that some plate mills which have been diverted to shell steel will go back to plates to meet the enormous ship building demand. The scarcity of steel continues marked. The only steel coming from America is wire rods, some of which are being offered at as high as £35 ($168), a rise of £5 ($24) on recent quotations. British users have to be satisfied for the most part with shell discard steel, instead of billets.

The value of June's imports of iron and steel was £86,962,349, which is lower than the total for the same period last year. Exports of British produce for the month totaled £43,-651,663, a decrease of £3,622,900 or 7.66 per cent. For the six months there was an increase of 5.53 per cent in imports, and of 3.72 per cent in exports. This shows that a substantial trade is being maintained. Figures relating to iron and steel show very eloquently how the nation is becoming more independent. The values of iron and steel imports were reduced by £358,949 and of exports by £5,-343,702 for the six months. For the month of June alone the quantity of iron and steel and manufactures thereof exported was 219,182 tons compared with 301,036 tons last year.

The attitude of leading lights of the iron and steel trades toward Germany was very well expressed a few days ago by Sir Edward Parkes, the member of parliament for central Birmingham, who is the owner of large iron works in the black country and has large industrial interests.

Sir Edward said that no one entertained any doubt that the war would be won by England and her allies It could not be said that the war had been a curse to the country. He believed in some respects, although it was a great price to pay, it had done England good. If it had not been for the war it was probable the lethargic conditions the country gradually was getting into would have been accentuated. As it was it had stirred the country to make every necessary sacrifice to win and in every way it had awakened the country to a sense of its responsibilities for the future. One of the foremost things the country must keep before it is the manufacturing interests. At one time it appeared that Germany would deprive it of most of its manufacturing industries which if it had been achieved would have meant the destruction of the country. Before the war, goods were sent from Germany and other parts of the continent which contained from 50 to 80 per cent and perhaps more of foreign work. Those goods were finished in England and then sent away as British goods. That must now be stopped. Nothing had been done at present with regard to fiscal arrangements with other countries but he was sure Great Britain would not again cultivate commercial arrangements with Germany.

Men of the Iron Trade

Personal News of a Business Character Regarding the Men of Affairs of the Industry

DeBARROS MOREIRA has severed his connection with the United States Steel Products Co., as general representative in Brazil, to become agency division manager of the Vulcan Steel Products Co., New York. Mr. Moreira will supervise the establishment of sales offices and agencies in various foreign cities

F. P. Huntley, who has been associated with the Gould Coupler Co., for the past 20 years, has resigned from his position as vice president and general manager.

Leland T. Johnson has been appointed special representative of the Acar Mfg. Co., 30 Church street, New York, with headquarters at the Hotel Sherman, Chicago.

A. C. Hubbard, purchasing agent, Andrews Steel Co., Newport, Ky., has resigned to accept the position of treasurer of the Charleston Steel Co., Belle, W. Va.

Frederick H. Koch has been made district representative of the Heppenstall Forge & Knife Co., Pittsburgh, Pa., in Wisconsin, with offices at 501 First National Bank building, Milwaukee.

Harold H. Hamilton, for seven years manager of the Whiting Mfg. Co., Bridgeport, Conn., has retired to take up the management of the Hamilton & DeLoss Co., in the same city, recently organized.

Henry J. Wiegand, superintendent of the Cutler-Hammer Mfg. Co., Milwaukee, has been named manager of the recently organized Wisconsin Gun Co., and will supervise the erection, equipment and operation of the plant.

George W. Bunnell, president of the Power Construction Co., Worcester, Mass., has been commissioned colonel of the First regiment Massachusetts engineers, the only regiment of its kind in New England. Colonel Bunnell is a West Point graduate.

C. A. Johnson and H. S. Johnson, president and secretary-treasurer of the Gisholt Machine Co., have been named as being prominently identified with the financing of the new Northwestern Ordnance Co., which was organized at the request of the government.

F. O. Ebeling, who has been general superintendent of the DePere Mfg. Co., DePere, Wis., boilers, tanks and structurals, has resigned to accept an executive position with Gage Bros., Chicago. He is succeeded by Ward Clark.

H. D. Kenney, long associated with the Humphreys Mfg. Co., Mansfield, O., as general manager, resigned his position with that company a short time ago to become president of the Kenney-McGreevy Foundry Co., Mansfield, O., founders and machinists.

F. J. Page, who for several years has been in the sales department of the Whiting Foundry Equipment Co., Harvey, Ill., at its home office, has been selected Pittsburgh representative of the company, with offices at 411 Fulton building.

Julian McGar, Bristol, Conn., who recently returned from Cuba, where he had charge of the installation of machinery for a large sugar company, has joined the engineering force of the New Departure Mfg. Co., Bristol, Conn. manufacturer of ball bearings.

William Ellis Rice, president of the Washburn & Moen Mfg. Co., and president and treasurer of the Worcester Wire Co., Worcester, Mass., until these companies were taken over by the American Steel & Wire Co., in 1899, celebrated his eighty-fourth birthday anniversary, Aug. 6.

Benjamin Lissberger of B. Lissberger & Co., manufacturer, smelter and dealer in metals, with general offices in the Woolworth building, New York, has been chosen vice president and a director of the Page Woven Wire Fence Co., Monessen, Pa., and Adrian, Mich.

W. W. Coleman, president of the Bucyrus Co., Milwaukee, has been chosen president of the Wisconsin Gun Co., Milwaukee, which recently was organized at the request of the government by representatives of five of the leading machinery and foundry concerns of Milwaukee.

Stewart C. Coey, associated with the Youngstown Sheet & Tube Co., Youngstown, O., for the past eight years as assistant superintendent of the mechanical and electrical departments, has resigned to take a position as general superintendent of the Celluloid Co. of America, at Newark, N. J.

Van Buren Ropke has been named vice president and general manager of Grainger & Co., Louisville, Ky., founders and machinists, succeeding W. C. Brohm, deceased. Other changes in the company include the naming of James T. Shade and Edward D. Cross as directors.

J. W. Smith, for many years secretary of the Northern Welding Co., Minneapolis, was named district manager of the Air Reduction Co. of America in Minneapolis territory, following the sale of the first named company to the Air Reduction Co. of America.

John H. Rempis, president, and E. Dews, vice president of the Rempis & Gallmeyer Foundry Co., Grand Rapids, Mich., have acquired the interests of Christian Gallmeyer who retired recently from the company and will conduct the business as formerly.

Lewis W. Everett, of the sales department of the Norton Co., Worcester, Mass., has been appointed interpreter and instructor in French to the United States marines. He will shortly report at Camp Quantico, Va., and will ultimately join the marines with the first American contingent in France.

John W. Kiser Jr., of Chicago, who recently succeeded his late father as head of the Phoenix Horse Shoe Co., has presented the government a patrol cruiser or submarine chaser, which is being built at New York, at a cost of $150,000. Mr. Kiser has also offered his personal services as a member of the crew.

Walter R. Morris has been chosen assistant traffic manager of the American Steel Export Co., with headquarters in New York. Mr. Morris formerly was assistant traffic manager of the American-Hawaiian Steamship Co., New York, but resigned owing to the suspension of service of that line.

C. A. Coffin, chairman of the board of the General Electric Co., Schenectady, N. Y., has succeeded Judge Robert S. Lovett as chairman of the

committee on co-operation of the Red Cross war council. Judge Lovett resigned from the Red Cross board to take a place on the war industries board and the central purchasing committee of the board.

M. V. Dreyspool, for five years in the purchasing department of the Central Georgian railroad in Savannah, Ga., and later New York representative of the Phoenix Iron Co., Phoenixville, Pa., lately has been chosen sales manager of the North American and British Isles department of the iron and steel division of the Vulcan Steel Products Co., New York.

Edward J. Kearney, secretary-treasurer of the Kearney & Trecker Co., Milwaukee, manufacturer of milling machines, has been appointed by Governor Philipp as one of three representatives of Wisconsin employers on the newly created state board of vocational education, which is a reorganization of the state board of industrial education.

Safety Work

In Iron and Steel Plants to be Discussed at Congress

Chicago, Aug. 14.—Safety developments in the iron and steel and foundry world will be discussed in special sessions of the sixth annual safety congress of the National Safety Congress at the Hotel Astor, New York, Sept. 10 to 14, inclusive. Monday, Sept. 10, will be given over to special committee meetings and the following day the annual meeting, including reports and election of officers, will be held. Wednesday morning a general session will offer address of interest to the entire gathering. The remaining days will be devoted to sectional meetings where special problems will be discussed.. The iron and steel section will hold sessions Wednesday afternoon, Thursday afternoon and Friday afternoon with numerous papers and discussions, and the foundry section will hold its session Tuesday morning.

Addresses to be presented at the several sections are as follows:

IRON AND STEEL SECTION

Wednesday, Sept. 12

Chairman, George T. Fonda, safety engineer, Bethlehem Steel Co., South Bethlehem, Pa.; vice chairman, Earl B. Morgan, safety engineer, the Norton Co., Worcester, Mass.; secretary, J. C. Smith, safety director, Inland Steel Co., Indiana Harbor, Ind.

Unsettled Accident Prevention Problems in Iron and Steel Industries, L. H. Burnett, assistant to president, Carnegie Steel Co., Pittsburgh.

Analyses of Accidents, Dr. Lucian W. Chaney, U. S. department of labor, Washington. Discussion: D. R. Kennedy, assistant to president, Youngstown Sheet & Tube Co., Youngstown, O.; L. W. Hatch, chief statistician, department labor, state of New York, Albany, N. Y.

Thursday, Sept. 13

Safety in Yard Practice, F. G. Bennett, safety director, Buckeye Steel Castings Co., Columbus, O. Discussion: J. Stanford Brown, supervisor, department of labor, safety and welfare, the Carpenter Steel Co., Reading, Pa.

Safe Practices in Sheet Mills, Frank E. Morris, safety engineer, American Rolling Mill Co., Middletown, O. Discussion: J. M. Woltz, safety director, Youngstown Sheet & Tube Co., Youngstown, O.

Open Hearth Hazards, Leslie M. Rice, district safety inspector, American Steel & Wire Co., Worcester, Mass.

Safety and the Foreman, J. S. Herbert, superintendent, safety department, Cambria Steel Co., Johnstown, Pa. Discussion: J. M. Larkin, service department, Fore River Shipbuilding Co., Quincy, Mass.

FOUNDRY SECTION

Thursday, Sept. 13

Chairman, F. G. Bennett, Buckeye Steel Castings Co., Columbus, O.; vice chairman, F. W. Shepard, safety inspector, American Cast Iron Pipe Co., Birmingham, Ala.; secretary, S. W. Ashe, educational and welfare department, General Electric Co., Pittsfield, Mass.

Method of Training and Obtaining the Cooperation of Foundry Foremen in Safety Work, W. E. Watters, National Malleable Castings Co., Melrose Park, Ill.

Treatment of Foundry Burns by Paraffine Substances, Dr. L. F. Mutschman, chief surgeon, American Steel Foundries, Alliance, Ohio.

How Improvement in Safety Conditions Reduces Labor Turnover and Accidents.

Practical Welfare Work in Foundries, S. W. Ashe, educational and welfare department, General Electric Co., Pittsfield, Mass.

Mechanical Safeguarding of Electric Traveling Cranes, J. Claude Smith, safety director, Inland Steel Co., Indiana Harbor, Ind.

Friday, Sept. 14

Low Voltage Hazards, Dr. C. A. Lauffer, medical department, Westinghouse Electric & Mfg. Co., East Pittsburgh. Discussion: Harold Kirschberg, consulting illuminating engineer, Pittsburgh.

Round Table Conference.—New Kinks in Eye Protection, L. L. Parks, safety and apprentice supervisor, American Locomotive Co., Schenectady, N. Y.; Drinking Water, J. H. Ayres, superintendent of safety, sanitation and welfare, National Tube Co., McKeesport, Pa.; First Aid, J. R. Mulligan, assistant safety engineer, Bethlehem Steel Co., South Bethlehem, Pa.; Lunch Rooms and Change Houses, John P. Eib, supervisor of safety and labor, Illinois Steel Co., Joliet, Ill.; Problems of Returning Injured Men, Earl B. Morgan, safety engineer, the Norton Co., Worcester, Mass.

Want Men Exempted

Some Connecticut manufacturers who are working on war orders are to ask for selective exemption of their employes taken in the first draft for the new army. It is expected but few will claim total exemption but most of them say that it is absolutely necessary that exemption be granted for many of their men. They will seek to have those men excused from service, without whom they feel they cannot proceed with their work.

Manganese Ore

Gains Heavily in Imports in Fiscal Year—Ferromanganese Declines

Washington, Aug. 14.—Imports of ferromanganese reached 3817 tons in June, making the total for the fiscal year 73,741 tons. This is a decrease of 2328 tons from the monthly average of 6145 in the year but is an increase over the 2019 tons received in May. Ferrosilicon imports, however, were better than the average and heavier also than June last year. The quantity, 869 tons, compares with the average of 726 tons and the June, 1916 figure, 536, and places the year's imports at 8715, as against 5469 tons a year ago. Manganese ore shipments received at American ports aggregated 62,778 tons, which is 8104 tons over the average and 4645 tons better than June, 1916. The total for the year was 656,088 tons, compared with 492,860 in the 12 months ending June 30, 1916.

The following table shows the comparisons of imports in gross tons of various ferroalloys and ores for June, 1916, and June, 1917, and the respective fiscal years:

	June, 1917	June, 1916	Twelve mos. end'g June, 1917	Twelve mos. end'g June, 1916
Ferromanganese.	3,817	.....	73,741	.....
Ferrosilicon	869	536	8,715	5,469
Mang. ore.....	62,778	58,143	656,088	492,860
Tungst. bear'g ore	343	.....	3,823	.....
Nickel, nickel oxide and matte.....	3,503	2,788	33,053	30,713

Drop Continues

In Steel Corporation Orders Which Now are Under Eleven Millions

For the first time since October, 1916, the unfilled tonnage of the Steel Corporation has dropped below the 11,000,000-ton mark. According to the statement issued Aug. 10, a decrease of 539,123 tons during July is shown, bringing the order book on July 31 to 10,844,164 tons. Hesitancy on the part of consumers because of uncertainty as to what the government might do is considered the reason for the July decline.

The unfilled tonnage figures over a period of some months showing by tons and percentages the respective changes are as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
July 31, 1917..	10,844,164	539,123—	4.74—
June 30, 1917..	11,383,287	503,304—	4.24—
May 31, 1917..	11,886,591	296,492—	2.43—
Apr. 30, 1917..	12,183,083	471,439+	4.02+
Mar. 31, 1917..	11,711,644	134,947+	1.16+
Feb. 28, 1917..	11,576,697	102,643+	0.90+
Jan. 31, 1917..	11,474,054	73,232—	0.64—
Dec. 31, 1916..	11,547,286	488,744+	4.43+
Nov. 30, 1916..	11,058,542	1,043,282+	10.41+
Oct. 31, 1916..	10,015,260	492,676+	5.18+
Sep. 30, 1916..	9,522,584	137,133—	1.42—
Aug. 31, 1916..	9,660,357	66,765+	.69+
July 31, 1916..	9,593,592	46,866—	0.48—
June 30, 1916..	9,640,458	297,340—	3.09—
May 31, 1916..	9,937,798	108,247+	1.11+
Apr. 30, 1916..	9,829,551	498,550+	5.34+

Iron and Steel Financial News

Up-to-the-Minute Fact and Comment Collected and Sifted For Busy Readers

Confusion Prevails in Business World

ANOTHER week has passed with no diminution of suspense in the minds of iron and steel business men. Conditions continue confused, with no man able to guess what his future will be. There is no rule to govern, no precedent to follow. Business proceeds, partly of its own momentum, partly because of the government's war efforts, but it proceeds in an aimless, preposterous manner. The government has decreed, through the war industries board, that the allies shall receive the same price treatment as the American government. It has suggested strongly that the same prices shall prevail for civil consumption. This situation has introduced a maze of uncertainties and seeming paradoxes. In case the government should attempt to suspend the regulatory function of prices, it would be necessary to develop a system of industrial rationing. But in the face of the setting up of such an extraordinary economic regime, what would become of the $2,000,000,000 tax schedule, 25 per cent of which was to be based upon "excess profits" resulting from high commodity markets? How will the managements of industrial corporations decide upon their subscriptions to the second liberty loan of 1917, to be opened soon with the slogan "Three billions in three weeks"?

Business must know what the government proposes to do and know it shortly, for business in suspense is a calamity. If necessary, business can adapt itself to almost any policy, provided it is definitely outlined, but none can tell today what the morrow will bring forth. Consumers are offering fantastic prices for material for nearby delivery, but are reluctant to commit themselves far ahead. Producers are likewise hesitant, for there is no means of knowing what the costs of labor and raw materials may be some months hence. Consequently a decrease of 539,000 tons is noted in the United States Steel Corp. bookings in the course of one month, bringing the decline in two months to 1,042,000 tons.

In addition to the uncertainty as to the scope of price fixing and governmental control, there are other unknown factors, such as the effects of recent drastic license embargoes, and the influence upon the labor situation of coming drafts for military service. But the situation has its bright spots. Recent crop reports show a better outlook for our food supply. The passing of the food control bill gives promise of more stable food prices. Labor continues fully employed at high wages, and retail trade, in most branches, is prosperous.

But the financial community has fixed its attention on the possible restriction of iron and steel prices by the government. Quotations on most of the steel stocks were marked down from one to three points last week, although all works are operating at capacity but are unable to meet the demand. The reason for the paradox is that Wall street is wondering what will be left for the stock market after the steel trade has passed between the Scylla of taxation and the Charybdis of price restriction.

Large Gain Shown

Net earnings of the Worthington Pump & Machinery Corp., New York, for the six-month period ended June 30, were $2,298,834, contrasted with earnings of $1,582,493 for the nine months ended Dec. 31, 1916, the first fiscal year of the company. After deducting preferred dividends and fixed charges, earnings on the 129,921 shares of common stock are equivalent to $28 per share.

Materials Are Costly

In connection with the recent announcement that the Westinghouse Electric & Mfg. Co. will arrange for $15,000,000 additional funds, an analysis of the cost materials used by the company has been prepared by Clark, Childs & Co., New York. The analysis demonstrates that 14 of the principal products used by the company have advanced an average of 314 per cent in 2½ years, the largest single advance being an increase of 942 per cent in the cost of plates used for frames. Increases in sheet steel extended from 153 to 443 per cent; coke, 522 per cent; malleable iron castings, 202 per cent, and wages, 50 per cent.

Colorado Fuel Reports Good Second Quarter

Net earnings of the Colorado Fuel & Iron Co., Denver, increased during the second quarter of 1917, aggregating $2,553,080 for the period, against $1,751,195 for the second quarter of 1916. The total surplus after deducting interest, taxes and fixed charges of other kinds was $2,078,184 for 1917, as contrasted with $1,276,421 for the corresponding period of 1916. Gross receipts were $11,978,996 in 1917 against $8,214,403 in 1916. A comparative table of data follows:

	1917	1916
Gross receipts	$11,978,996	$8,214,403
Operating expenses	9,425,916	6,463,208
Net earn. from op.	$2,553,080	$1,751,195
Inc. fr. oth. sources	328,285	233,794
Total income	$2,881,365	$1,984,989
Deduct:		
Bond int., taxes, sinking funds, etc.	803,181	708,568
Surp. for quarter	$2,078,184	$1,276,421

Increases Capital

The Washburn Wire Co., Phillipsdale, R. I., maker of high grade steel, steel billets, wire, rods, etc., has changed its domicile from Maine to Delaware and increased its capital from $3,725,000 to $11,000,000. The company owns the entire $750,000 stock of the American Electrical Works, which makes copper wire, cables and galvanized iron wire and strands, and has its plants also in Phillipsdale.

New Stack is Offered

Pursuant to a plan for the acquisition of the manufacturing equipment of the Toro Motor Co., St. Paul, the assets of the Bull Tractor Co., Minneapolis, and the Whitman Agricultural Implement Co., St. Louis, $600,000 8 per cent preferred stock of the

Whitman Bull Tractor Co., St. Louis, recently incorporated in Delaware, is being offered. The management of the new company includes: President, P. J. Lyons; vice president, H. L. Whitman Sr.; vice president and general manager, James W. Lyons; vice president, P. H. Knoll; secretary and manager of foreign sales, H. L. Whitman Jr.; treasurer and chairman, Lawrence B. Pierce, and directors, in addition to the officers, L. W. Childress, J. F. McCarthy and Isaac Orr.

Ball Bearing Plant Gains With Standard Parts

The plant and assets of the American Ball Bearing Co., Cleveland, a half-million dollar corporation, has been sold to the Standard Parts Co., Cleveland, of which Christian Girl is president. Actually, the sale is a consolidation, the assets of the American Ball Bearing Co. are to be appraised and its stock exchanged on a valuation basis for the common stock of the Standard Parts Co. The purchaser plans to use the recently acquired plant for the production of heavy axles for motor trucks. Capitalized at $30,000,000, the Standard Parts Co. showed earnings of $1,994,000 for the January-June period of 1917 after the deduction of preferred dividends and fixed charges, or at the rate of 56 per cent per annum on the common. Net earnings in June, the banner month, were $360,824.

Savage Earnings Decline

The Savage Arms Corp. reports total earnings of $462,105 for the quarter ended June 30, against earnings of $2,031,858 for the first quarter. After the payment of all charges a balance of $431,458 remained, which compares with a balance of $1,249,052 for the quarter ended March 31. Common dividends of $132,582 were paid, leaving a surplus of $298,920 for the quarter ended June 30, against a surplus of $1,249,052 for the quarter ended March 31.

Board Makes Defense

Defending the policy of the board of the Canadian Locomotive Co., Kingston, Ont., the directors have issued a statement to the stockholders in which the request for proxies made by Sir Henry Pellatt and M. J. Haney, who represent a minority interest in the company, is attacked. The statement lays stress on the facts that the company's affairs will need able administration to meet conditions after the war, and that these difficulties are likely to be no more serious than those already encountered. In conclusion, the directors affirm that the presence of Mr. Haney and Sir Pellatt would not be conducive to the harmony of the board.

Votes Capital Increase

The Eagle Lock Co., Terryville, Conn., at its annual meeting elected the following officers for the ensuing year: Rollin J. Plumb, president and treasurer; Henry B. Plumb, Brooklyn, secretary; Otis B. Hough, assistant treasurer. Directors include the officers and F. O. Wilcox, New York; W. T. Woodruff, Thomaston, Conn.; A. E. Hart, Hartford, Conn., and H. B. Balch, New York. Formal acceptance to the amendment of the company's charter, authorizing an increase in capitalization from $1,000,000 to $5,000,000 was voted. The company has a total surplus of about $8,000,000. It is expected the directors will double the present capital.

Decide on Dissolution

The stockholders of the Rhode Island Perkins Horse Shoe Co., Valley Falls, R. I., at a meeting held Aug. 3, voted to make application to the courts for the dissolution of the corporation. The plant has been idle the past year on account of labor troubles. The business was started in 1867 to develop the invention of horse shoe machinery designed by Charles H. Perkins and was financially successful from the start. When the company was reorganized in 1891 its capital was increased to $2,750,000. On this capitalization the company has returned to its stockholders more than $2,600,000 in cash and has its plant and quick capital intact.

Protests Note Issue

C. W. Taintor, Boston, in protesting the sale of $15,000,000 6 per cent notes by the General Electric Co., Schenectady, N. Y., wired E. W. Rice, president of the company, receiving "the right to take any action or actions considered necessary to protect my interests and those of my associates". The issue of notes under protest are of 6 per cent denomination and were subscribed to the amount of approximately $80,000,000, or about five and one-half times the amount offered.

Acquires Welding Plant

The Air Reduction Co. of America, Walter W. Birge president, has acquired the Northern Welding Co., Minneapolis, maker of welding materials, together with its subsidiary, the Duluth Gas Co., Duluth, for a consideration of $400,000. E. H. Smith, formerly president of the Northern Welding Co., has retired and J. W. Smith, formerly secretary of that company, has been made district manager for the Air Reduction company. Plans have been made to greatly increase the output of the Minneapolis plant. The Air Reduction Co. of America is owned by interests identified with the National City Bank of New York and financiers associated with the Standard Oil Co.

Financial Crop Ends

Sales of the Thomas Iron Co., Milwaukee, aggregated $2,837,433 for the year ended June 30. The gross income was $289,770 and the surplus after interest, dividends and payment of fixed charges was $184,873.

* * *

Directors of the American Rolling Mill Co., Middletown, O., have increased the capital stock of the company from $8,300,000 to $21,500,000, divided into $20,000,000 common and $1,500,000 preferred. No action has been taken in regard to the reduction of the value of the stock.

* * *

A company has been formed by St. Louis and Alma, Mich., interests to purchase the stock of the Standard Foundry Co., St. Louis, Mich. Officials of the Republic Truck Co., of Alma, own a majority of the stock and it is said that the present capacity of the plant will be more than doubled. Castings for the Republic Truck Co. will be the principal product.

* * *

Control of the Valley Mould & Iron Co., Sharpsville, Pa., has been purchased by a syndicate headed by John Sherwin, president of the First National bank, Cleveland. Mr. Sherwin says no changes are to be made in the management of the company. Mr. Sherwin has been interested in this company for some time, and will take a more active part in its affairs from now on. The Valley Mould & Iron Co. operates the Alice blast furnace at Sharpsville, which was formerly owned by the Youngstown Sheet & Tube Co. It operates a large mold foundry.

* * *

Capitalized at $350,000 and consisting of $100,000 preferred and $250,000 common, the Lau Iron Works Co., Youngstown, recently was chartered by A. W. Lau, E. E. Swartswelter, John R. Rowland, John T. Harrington and H. E. Grosshans, to take over the business which has heretofore been conducted under the same name with A. W. Lau as sole owner. None of the preferred stock will be issued at this time and only about half of the common. A site of 4½ acres recently was acquired in the Brier Hill district and will be used for the construction of a plant to continue the company's business as fabricators of structural and ornamental iron and steel.

Shipyards Week's Biggest Buyers

Munition Makers Fail to Purchase as Heavily as Previously But Heavy Expenditures Are Made for New Vessel Building Projects—New Ways Planned in East and South—Many Contracts Placed

AS PLANS begin to take more definite shape in Washington, the eastern machine tool trade becomes even more keen in its anticipation of the heavy requirements of the government. These vast needs are being reflected, perhaps more so than ever before, by the large lists now pending, the number of new projects proposed and the rapidly developing plans for huge enterprises already under way. The far-reaching and highly diversified nature of this demand is holding at attention builders of virtually every description of machine tools.

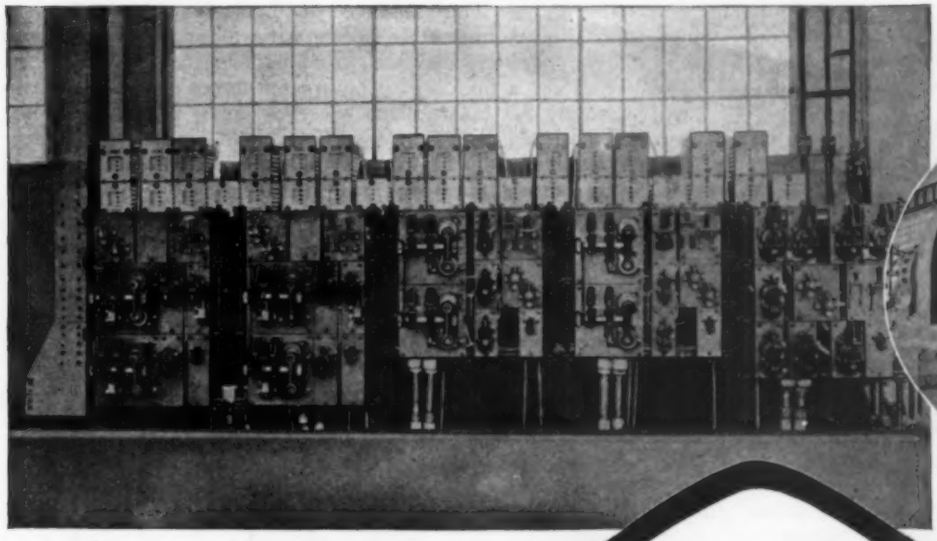
During the past week actual trading in the east on the part of domestic consumers appeared somewhat slower, this being particularly true in the instance of munition makers, who recently have been active on a number of small lots of miscellaneous equipment. In the export business, France continued to figure heavily in the market. Japan also remained in the market, placing some comparatively small orders for shipbuilding equipment.

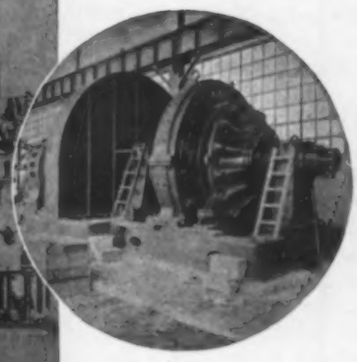
Perhaps the largest list pending in the east at this time is that of the Federal Shipbuilding Co., recently announced, involving tools of practically every description. The magnitude of this order may be drawn from the fact the punching and shearing machinery alone aggregates approximately $200,000. Another large list understood to be out at this time is that of the Foundation Co., which has a shipyard near Newark, N. J. This inquiry calls for several locomotive cranes, punching and shearing machinery, ship rolls and other tools. The Groton Iron Works, Groton, Conn., which recently closed on several large cranes, has inquiries out for three standard traveling cranes and two gantry cranes. The bureau of supplies and accounts, navy department, will receive bids Aug. 21 on one 15-ton crane and four universal grinding machines for the plant at Charleston, W. Va. Among the orders placed within the last few days is that of the Newport News Shipbuilding & Dry Dock Co., which bought 11 cranes ranging from 5 to 20 tons in capacity, from the Milwaukee Crane Co. The Midvale Steel Co. placed an order for two 60-ton trolleys, and the William Cramp & Son Ship & Engine Building Co. awarded a contract for a 5-ton crane. It is reported that the Downey Shipbuilding Co. has placed some further orders, and still is in the market. The General Electric Co. continues to buy tools for its Schenectady, N. Y., plant, but on a greatly reduced scale as compared with that of a few weeks ago.

Included in the more important developments of the past week was the announcement that the Tennessee Coal, Iron & Railway Co., the southern subsidiary of the United States Steel Corp., purchased land near Mobile, Ala., on the Warrior river, and shortly will start on the erection of a large shipyard. The Kelly-Atkinson Co., Chicago, has started construction on a plant at Pascagoula, Miss., where it plans to build 20 vessels, of 3500 tons each, for the United States government. The contract for these vessels, aggregating $9,000,000, calls for delivery by December, 1918. About $500,000 will be spent for yard and equipment. A report of interest to the trade is that Averill Harriman has secured control of the Chester Shipbuilding Co., on the Delaware river at Chester, Pa., and plans enlargements, and also has purchased a large tract at Bristol, also on the Delaware river, for the construction of a plant comprising 12 ways. It is stated that Mr. Harriman has practically closed with the Emergency Fleet Corp. for 80 steel ships of 8000 to 12,000 tons capacity each. The Traylor Shipbuilding Co. will erect 10 ways on its property at Cornwell Heights, Pa. Contracts have been placed, according to Secretary Daniels, for a $1,000,000 aircraft plant at the League island navy yard, Philadelphia, to be completed in approximately three months. Oscar Daniels & Co., New York City, are understood to be negotiating for government shipbuilding contracts, and at the same time are considering the erection of a yard at Brunswick, Ga., comprising eight ways. Another shipyard planned for the southeastern coast is that of the North Carolina Shipbuilding Co. to be established at Morehead City, N. C. It is understood this will be a relatively small plant. The East Coast Ship Co. has been organized at Boothbay Harbor, Me., with $200,000 capital, and is reported to be planning the construction of a plant. Z. E. Cliff, Somerville, Mass., is president. The Eastern Steel Co. plans additions and improvements, which will increase the capacity of its plant at Pottsville, Pa., approximately 33 per cent. The American Steel & Wire Co. will award contracts shortly for plant additions at New Haven, Conn. The New York, New Haven & Hartford railroad will start work soon on a $139,000 round house and machine shop at New Haven. The Magnus Co., Inc., Buffalo, has placed the contract for a $50,000 foundry.

War Needs Get First Consideration

ORDNANCE and army truck manufacturing concerns are unusually active in the Chicago machinery market. Some dealers find a smaller number of orders but a larger total of business closed. In addition to the Northwestern Ordnance Co., Madison, Wis., and the Wisconsin Gun Co., Milwaukee, a third large concern is forming in this territory and has been feeling out the market for equipment. Machinery for the first two has been bought. All these orders are preferential and take precedence over other buyers. Planers are in heavy demand and are difficult to buy, either new or used. One dealer who bought several used planers recently sold them before they had been in his possession more than a day and offers were made after their sale carrying much higher prices than he realized. Delivery promises by makers vary from prompt on some lines to August, 1918, on others. The Chicago, Milwaukee & St. Paul railroad has construction under way for the electrification of a section of 211 miles of road in the Cascade mountains from Othello to Seattle, Wash., which is calling for much equipment. The General Motors Co., Detroit, is about to build forge shops that will require nine electric traveling cranes





AGATHON

Alloy STEELS

are made in the first steel plant ever designed in which every mechanical operation is carried out by electricity.

This aids in maintaining "AGATHON" Quality by (1) allowing every single mechanical operation to be timed and executed to the fraction of a second and (2) by enabling the workman to concentrate on his work unhampered by mechanical considerations.

It offers a further advantage to the user inasmuch as it effects a big saving of time where time can logically be saved.

"AGATHON" Steels will serve your purpose best.

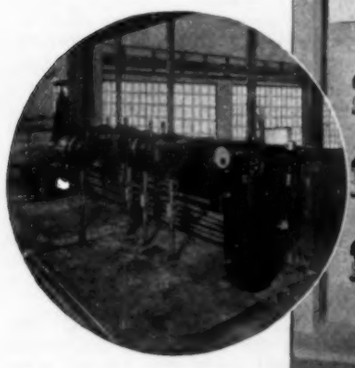
The Central Steel Company

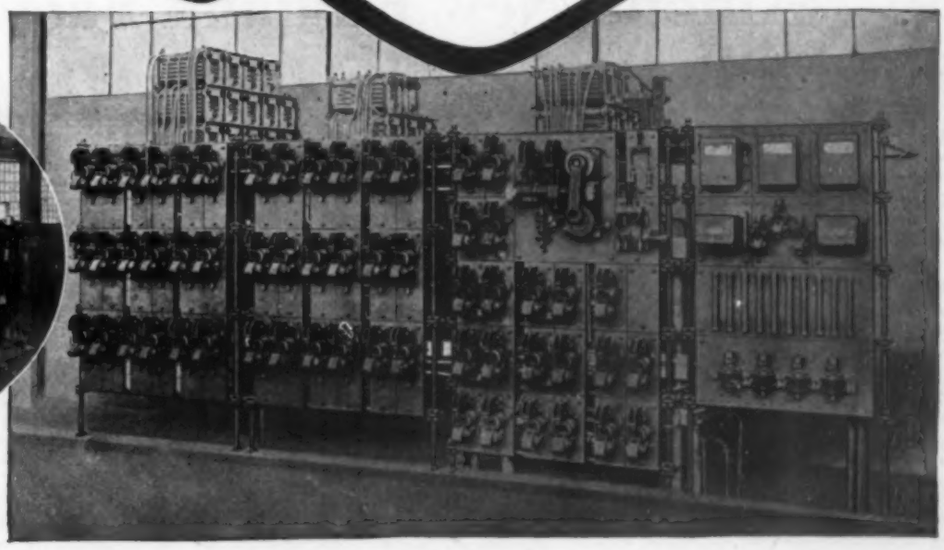
Massillon, Ohio

Detroit Office: 326-27-28 Ford Bldg., F. Walter Guibert, Dist. Representative. **Cleveland Office: Hickox Bldg.**, The Hamill-Hickox Co., Dist. Representatives. **Chicago Office: 1370 People's Gas Bldg., 122 S. Mich. Blvd.**, A. Shaeffer, Dist. Sales Mgr. **Philadelphia Office: 902 Widener Bldg.**, Frank Wallace, Dist. Sales Mgr. J. E. Dockendorff & Co., 20 Broad St. New York, Gen'l Export Agents.

AGATHON STEELS TRADE MARK

"AGATHON" Chrome Nickel
"AGATHON" Chrome Vanadium
"AGATHON" Nickel Steels
"AGATHON" Special Analyses
"AGATHON" Vanadium
"AGATHON" Chrome Steel
"AGATHON" High Carbon





of 10 to 15 tons capacity. Foundry companies are building and enlarging to meet demands for castings. The Peoria Malleable Iron Co., the Peru Foundry Co., both in Illinois, will build large plants. The Alexander Railroad Crossing Co., Clinton, Ill., will build a plant for manufacturing railroad appliances at Chicago Heights. The Hydraulic Hoist Mfg. Co., St. Paul, will build a factory.

Good Buying Expected in Pittsburgh

THE domestic market for machine tools in Pittsburgh borders on stagnation, although dealers believe many of the pending inquiries will be closed just as soon as the general situation becomes more nearly normal. Inquiry for equipment for the manufacture of munitions continues heavy, but scarcely any information is being offered about contracts for military necessities. The Superior Steel Corp., Pittsburgh, with works at Carnegie, Pa., is in the market for a 1500-kilowatt mixed flow pressure turbine producing 230 to 250 volts. The National Products Co., East Liverpool, O., is in the market for several 1000, 1500 and 2000-pound steam hammers. The Pennsylvania railroad has revised its negotiations of miscellaneous line of tools for its shops at Fort Wayne, Ind. The Pennsylvania company is asking bids on a number of additional tools for shipment to France for use in locomotive and car repair shops in back of the American front.

Many Scattered Inquiries in Cleveland

CLEVELAND machine tool dealers characterize the local market as slow and scattered. Inquiries are appearing for miscellaneous lots of tools, but in no case has the demand been for more than one or two machines. The absence of lists in the Cleveland market is noticeable. The City Machine Co., whose plant was recently destroyed by fire, has filed application for a building to be erected at a cost of approximately $20,000. Plans are now being prepared. The Parish & Bingham Co., Cleveland, is having plans prepared for an extensive machine shop addition to its present plant on Madison avenue and West 108th street. The Erie Forge Co., Erie, Pa., K. E. Blair, purchasing agent, will be in the market shortly for several large-diameter lathes. The Humphreys Mfg. Co., W. F. Moore, Mansfield, O., is in the market for a cylinder polishing machine. This company expects to be in the market in the very near future for a large number of machine tools. The Skinner Engine Co., Erie, Pa., is in the market for one 26-inch x 16-foot engine lathe; one 30-inch x 16-foot engine lathe, and one 42-inch Bullard, or equivalent, vertical boring mill. The Ohio Crane Co., Bucyrus, O., is in the market for one 1½-inch bolt cutter, and one 36-inch vertical boring mill with one head, one rail and one side head. The Loomis Machine Co., Tiffin, O., is in the market for a 26-inch to 28-inch used engine lathe. The National Drawn Steel Co., East Liverpool, O., is said to be in the market for a steam hammer and a number of machine tools. The McMyler Interstate Co., Bedford, O., is said to be in the market for a number of heavy-duty lathes suitable for gun boring. A wide line of tool room equipment will likely be purchased in the near future. It is stated that since the McMyler Interstate Co. has received, or is about to receive a large contract for war materials, this equipment will be used in the production of munitions.. Prices are unchanged and with the exception of milling machines, good deliveries may be had on almost all shop equipment.

New Construction and Equipment

Concise and Timely Business Building Opportunities from the Field of Industry

Among New England Factories

LANCASTER, N. H.—The Thompsen Mfg. Co. has let contracts for a $20,000 on 1-story, 34 x 52-foot foundry.

WALPOLE, N. H.—A general contract has been let to H. Wales Lines Co. for a round house for the Boston & Maine railroad.

BOSTON. — The Globe Iron Works has been incorporated with $10,000 capital by Otto E. Kuehl, Charles A. Swenson and H. A. Kuehl.

NEW BEDFORD, MASS. — The Klots Throwing Co. will build a 50 x 300-foot addition to its mill on Purchase street.

NORTH ATTLEBORO, MASS.—The V. H. Blackinton Co. has let the contract for a brick, 40 x 130-foot addition to its factory.

WORCESTER, MASS.—The E. J. Cross Co. has been awarded the contract to erect a reinforced concrete, 3-story, 65 x 200-foot storehouse to cost $250,000, for the Crompton & Knowles Loom Works on Tainter street.

BOSTON.—The Scott Linotyping Co. has been incorporated with $25,000 capital by William D. Plumb, Daniel D. Scott, and Edward F. Collier.

BOSTON.—The Ruby Mica Co. has been incorporated with $250,000 capital by Lewis M. McKenney, William J. Martin, and Amasa C. Gould.

BOSTON.—The American Sugar Refining Co. has let the contract for a steel, brick and concrete, 3-story, 110 x 126-foot garage and stable to cost $58,000 at 54 Granite street, South Boston, Mass.

GARDNER, MASS.—The Levinson Mfg. Co., Jersey City, N. J., has purchased the Parker mill property and will erect a 2-story, 50 x 150-foot factory. Machinery will be transferred from the New Jersey plant.

WORCESTER, MASS.—The Affa Specialty Co. has been incorporated to make automobile specialties with $5000 capital by Walter I. Stearns, Walter S. Graffam and Charles B. Rugg.

NEWPORT, R. I. — John W. Danforth, Buffalo, N. Y., has been awarded the contract by the government to erect a concrete and steel fuel storage plant at the naval coal depot in Mellville, R. I., for about $294,394.

PAWTUCKET, R. I.—The Potter & Johnston Machine Co. has let the contract for a brick and steel, 102 x 252-foot and a 22 x 84-foot addition to its machine shop, to cost $50,000.

BRIDGEPORT, CONN.—The Atlas Iron Works has been incorporated with $5000 capital.

BRISTOL, CONN. — Hamm, Meiklem & Runge will erect a concrete mill to make concrete shingles. Special machinery will be installed.

MERIDEN, CONN.—The American Mfg. Co. has been incorporated to make castings and other metal goods with $50,000 capital by F. E. Demers, David J. Murphy, O. S. Montambault, all of Waterbury, Conn.

NAUGATUCK, CONN. — The Naugatuck Chemical Co. has let the contract for a 1-story, 47 x 64-foot addition to its acid

ONE
30-Ton Open Hearth
FURNACE
Now Ready.

Who wants the Entire Production of it for Ingots or Shell Blanks?

Hubbard Steel Foundry Co.
EAST CHICAGO, IND.
All Kinds of Iron and Steel Rolls and Steel Castings.

Say you saw it in THE IRON TRADE REVIEW

building and a 1-story, 35 x 87-foot storage building.

NEW HAVEN, CONN. — The Belmont Iron Works, New York, has the contract for the erection of a factory to cost $25,000 on Wheeler street for the Penn Seaboard Steel Corp.

NEW HAVEN, CONN.—The drop forging plant of the Kilbourn & Bishop Co. was damaged to the extent of several thousand dollars by fire Aug. 4. The interior of the building was practically ruined.

NEW HAVEN, CONN.—The New York, New Haven & Hartford railroad, will begin work soon on a 1-story round house, to cost $139,000. The structure will be of concrete, 97 x 238 x 486 feet.

STAMFORD, CONN.—The Stamford Iron & Steel Co. has been incorporated with $10,000 capital by Paul V. Hoyler, Albert C. Smith, and George G. Hammill.

WATERBURY, CONN. — The Waterbury Gas Light Co. is building a new gas-making plant to cost $75,000. Automatic coal handling machinery is to be installed.

WATERBURY, CONN. — The Henderson Brothers Co. has been incorporated to make metal goods and deal in machinery by M. M. Henderson, Gilbert M. Henderson and John M. Henderson, Rome, N. Y.

Along the Middle Atlantic Seaboard

BROOKLYN, N. Y. — Plans are being drawn for a $50,000, 1-story, 53 x 100-foot transformer station for the Interborough Rapid Transit Co. Theodore P. Shonts, 165 Broadway, New York, is president.

LONG ISLAND CITY, L. I.—The Tock Screw Machine Corp. has let the general contract for a $12,000, 1-story, 50 x 100-foot plant to M. J. Erwin & Sons, Buffalo, N. Y.

NEW YORK.—The American Shell Co. has been chartered in Delaware with $2,000,000 capital to deal in castings of all kinds. A. W. Britton, S. B. Howard and H. O. Coughlan, Jersey City, N. J., are the incorporators.

NEW YORK.—The Tri-Ton Corp. recently was incorporated with $5000 capital to manufacture motors and engines. The incorporators are A. L. Fullman, J. H. Behan and M. E. Peoples, 302 Broadway.

NEW YORK.—The Amboy Refining Corp. recently was chartered with $99,000 capital to operate refineries for petroleum products. J. J. Schwartz, D. B. Luckey and M. J. Bevans, 15 Cypress avenue, are the incorporators.

NEW YORK.—The Progressive Machine & Metal Products Co. has been incorporated with $10,000 capital to manufacture engines, boilers and machinery. I. Katzner, A. Kipniss and L. Olitsky, 1517 Fifty-third street, are the incorporators.

NEW YORK.—The Imperial Lead Corp. has been incorporated in Delaware with $1,650,000 capital to smelt and refine, lead, zinc, etc. The incorporators are: S. B. Howard, G. C. Reilly and G. Ermold Jr., Jersey City, N. J.

NEW YORK.—The Peerless Unit Ventilating Corp. has leased its plant located on the northeast corner of Tenth street and Sixth avenue, College Point, L. I., to the L. W. F. Engineering Corp., manufacturer of airplanes, for a term of five years.

NEW YORK.—The International Steel & Ordnance Co. has been incorporated in Delaware with $2,000,000 capital to engage in the production of machines, tools, hardware and other metal products. The incorporators are: A. W. Britton, H. O. Coughlan and S. B. Howard, Jersey City, N. J.

NEW YORK.—Averill Harriman is reported to have acquired the plant of the Chester Shipbuilding Co. at Chester, Pa., and also other property at Bristol, for the establishment of a shipbuilding plant there comprising 12 ways. It is understood five ways will be added to the Chester plant, which will also give it 12 ways.

ROCHESTER, N. Y.—Contracts have been let for a $15,000 machine shop for the Northeast Electric Co.

ROCHESTER, N. Y. — The Symington-Anderson Ordnance Co. has filed an application for a permit for a 227 x 650-foot machine shop to cost $280,000.

SYRACUSE, N. Y. — Thomson & Binger have been awarded the general contract for a $200,000, 3-story, 52 x 250-foot plant addition for the Continental Can Co.

ALTOONA, PA.—Bids are being received by Frederick Meystre, architect, Hoboken, N. J., for a 4-story, 50 x 300 foot addition to the silk plant of the Schwarzenback Huber Co.

Government Inquiries

The Navy Department, Bureau of Supplies and Accounts, Washington, D. C., is in the market for the following machine tools:

One motor-driven radial drill, 1395, Aug. 21, Charleston, W. Va.
One back-geared engine lathe, 1396, no date, Mare Island, Cal.
One motor-driven engine lathe, 1404, no date, Key West, Fla.
One 24-inch motor-driven turret lathe, 1400, Fort Mifflin, Pa.
One 66-inch horizontal boring and drilling machine, 1404, no date, Fort Mifflin, Pa.
Four universal grinding machines, 1399, no date, South Charleston, W. Va.
One 200-ton hydraulic forging press, 1404, no date, Key West, Fla.

Schedule numbers and place of delivery follow the specifications of the tools. Further information may be had on application from the Navy Department, Bureau of Supplies and Accounts.

ATHENS, PA.—The Ingersoll-Rand Co. has awarded a contract for a 168 x 204-foot machine shop addition.

BUTLER, PA. — The Keystone Pipe & Supply Co. is in the market for a 4-inch pipe machine.

HAMBURG, PA.—The Hamburg Foundry Co. has been incorporated with $50,000 capital by D. H. Redmond, Philadelphia, and others.

PHILADELPHIA.—Architect M. C. Cookman is ready for bids on a $20,000 power plant for the Pennsylvania railroad at Girard Point.

PHILADELPHIA.—The Direct Drive Motor Co., capitalized at $2,000,000, recently was chartered in Delaware by F. S. Hansell, J. Vernon Pimm and S. C. Seymour.

PHILADELPHIA.—The William Steel & Sons Co. has received the general contract for a $100,000, 5-story, 50 x 122-foot factory addition for the Lauston Monotype Machine Co.

PHILADELPHIA.—The Temple Malleable Iron & Steel Co. is receiving bids for the construction of the following buildings: One-story, office building, 50 x 46; carpenter and pattern shop, 36 x 90; locker building, 41 x 52; power house, 60 x 81; shipping and annealing building, 95 x 236; malleable foundry, 156 x 285; hard iron building, 36 x 170 and a sand shed, 24 x 115.

PITTSBURGH. — The Pittsburgh Mining Machinery Co., capitalized at $100,000, recently was incorporated by T. H. Edelblute and others.

SCRANTON, PA.—Duckworth Bros., architects, are planning the erection of a $12,000, 1-story, 30 x 150-foot factory addition for the McLave-Brooks Co.

WEST HAZLETON, PA.—The Gross Mfg. Co. is enlarging its foundry and erecting a new pattern shop.

WILKESBARRE, PA. — W. H. Michael Son & Co. are receiving bids through their architects, McCormick & French, for a $15,000, 1-story, 53 x 117-foot machine shop addition.

WILLIAMSPORT, PA. — The Lycoming Rubber Co. will start work soon on a $40,000, 5-story, 64 x 103-foot plant addition. Lockwood & Green Co., Boston, are the architects.

YORK, PA.—The Keystone Machine Co. recently was chartered with $5000 capital by M. S. Niles and others.

HARRISON, N. J. — The Driver-Harrison Co. has awarded the contract for a $25,000, 1-story, 75 x 200-foot foundry.

JERSEY CITY, N. J.—The International Loading Co. has been chartered with a capital of $1,500,000 by Arthur W. Britton, Samuel B. Howard and George V. Reilly, Jersey City, N. J.

JERSEY CITY, N. J.—The Des Lauriers Aircraft Co. has been incorporated with $5,000,000 capital to manufacture airplanes by John De Wary, Royal R. Kelly and Harry A. Dahlen, Jersey City.

SEWALLS POINT, N. J.—Contracts for a base hospital at Cape May and a coast air station at Sewalls Point have been awarded to Cramp & Co., at an aggregate cost of $700,000. Buildings will include a coast air station, pier, hangars, machine shops, quarters for men, hospital, administration buildings, barracks and other quarters.

TRENTON, N. J.—The Empire Tire & Rubber Co. contemplates doubling the capacity of its plant, which now occupies 26 acres. C. Edward Murray Jr., is vice president.

WILMINGTON, DEL.—The Anglo-American Lens Grinding Corp. has been chartered with $1,000,000 capital to construct and operate machines for grinding lenses. The incorporators are: C. L. Rimlinger, M. V. Haywood and Clement M. Egner, Elkton, Md.

WILMINGTON, DEL.—The Grant Hammond Mfg. Co. has been incorporated with $250,000 capital to manufacture pistols and machine guns by Arthur W. Britton, Samuel B. Howard and Louis H. Gunther.

WILMINGTON, DEL. — The All-Steel Wheel Co. has been organized with $200,000

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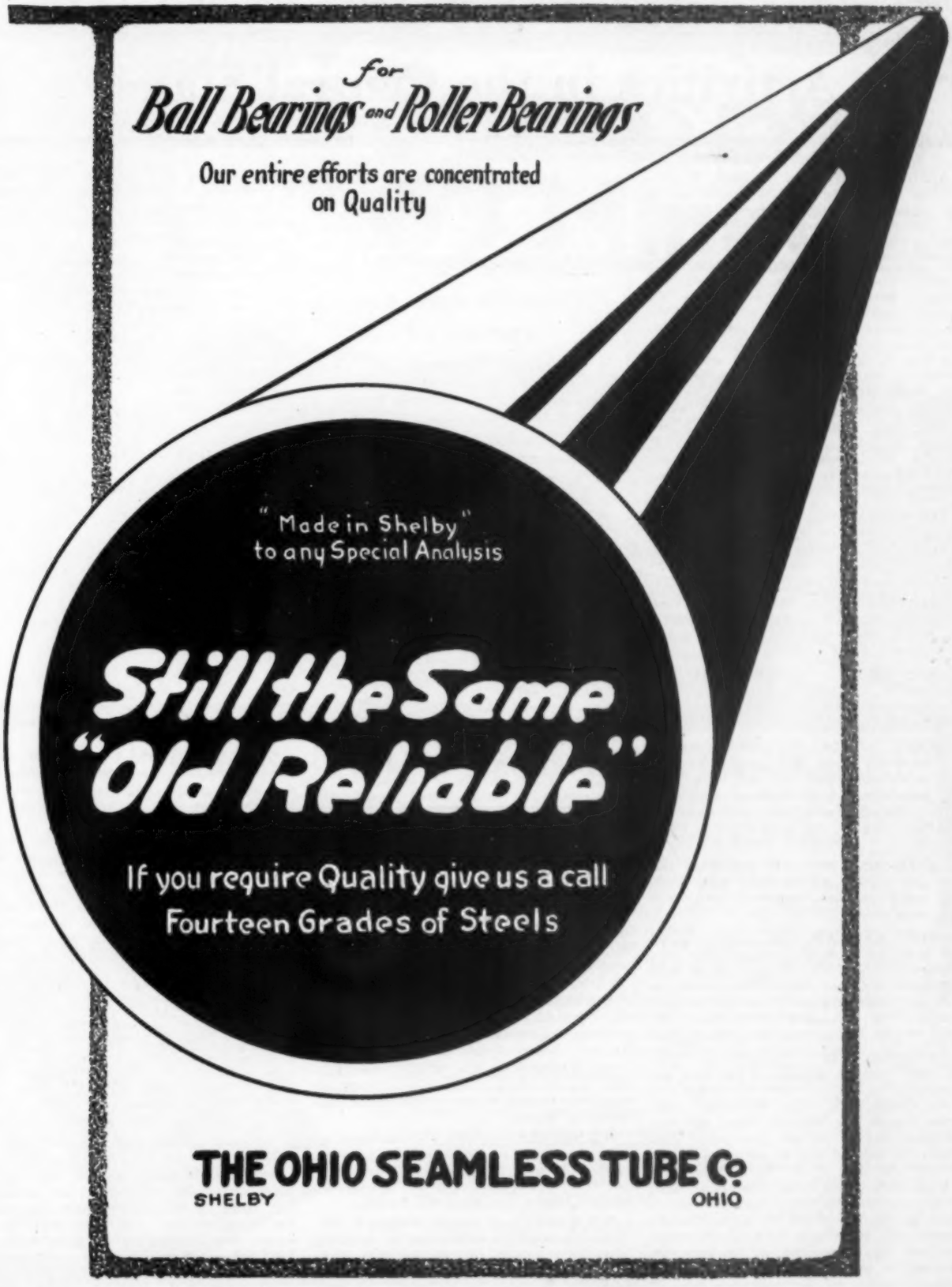
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capital to manufacture wheels. F. R. Hansell, J. Vernon Pimm and S. C. Seymour, Camden, N. J., are the incorporators.

WILMINGTON, DEL. — The Hall Air Lock & Supply Co. has been incorporated with $1,500,000 capital to manufacture railway supplies of all kinds by M. L. Rogers, L. A. Irwin and H. W. Davis.

COWAN, MD.—A general contract for a $15,000, 1-story, 50 x 100 foot factory and boiler house has been awarded by the Black & Decker Mfg. Co., to the Cowan Building Company.

NORFOLK, VA. — The Southern Supply Co. requests dealers' prices on several nailing machines; also on a Chase turbine double-end tenoning machine.

WASHINGTON. — Secretary Daniels has announced that the government will build a $1,000,000 aircraft plant for the navy at the League Island navy yard, Philadelphia. Contracts have been placed for the plant on the basis of completion of buildings and beginning of operations in less than 100 days.

Activities in the Central States

APPLETON, WIS. — Architect W. W. DeLong is preparing plans for a new factory and workshop for the Appleton Auto Body Co., which recently increased its capital stock from $15,000 to $25,000. Work will begin about Sept. 1.

APPLETON, WIS.—The Auto Body Co. is having plans prepared by Architect W. W. Delong, Appleton, for a new automobile body manufacturing works to cost about $20,000. The company was organized last February and recently increased its capital stock from $15,000 to $25,000. Dudley Pierce, 840 College avenue, is president.

ASHLAND, WIS. — Tomlinson & Egan, Ashland, Wis., have taken the general contract for erecting a new high school at Nash, Bayfield county, the seat of the Barkdale works of the DuPont Powder Co. The structure will cost about $75,000 complete.

BARKDALE, WIS.—The Barkdale works of the E. I. DuPont De Nemours Co., Wilmington, Del., it is reported, plans to build about forty new buildings of all kinds. Fred T. Beers is general superintendent.

CAMPBELLSPORT, WIS.—Wealer Bros. are establishing a plant for the manufacture of various mechanical appliances including hoists, etc.

FOND DU LAC, WIS.—Plans have been completed for a steel and concrete bridge 650 feet long over St. Louis River costing $85,000.

GRAND RAPIDS, WIS.—Otto Schumann has leased the former plant of the Hart Mfg. Co., stoves and heaters, and will equip it for the manufacture of all kinds of sheet metal work. Mr. Schumann was associated with the Hart company until it moved from Grand Rapids.

GREEN BAY, WIS.—The Fox River Cornice Co., manufacturer of sheet metal work, will install additional equipment in a plant just taken over.

GREEN BAY, WIS.—The Lawson Aircraft Co., organized in March to manufacture aeroplanes and parts, and having a capital stock of $50,000, has been reincorporated under the style of Lawson Aircraft Corp. with $200,000 capital. The incorporators are George W. Ellis, William Hoberg and Alfred W. Lawson.

KENOSHA, WIS. — The Specialty Brass Co. will build an addition to its shop and foundry.

MADISON, WIS.—The Wisconsin Interurban System Co., Madison, Wis., has been refinanced and will resume construction work shortly on the first unit of its proposed electric railroad from Stoughton to Madison.

MADISON, WIS.—The Wisconsin Interurban Co., Madison, Wis., organized several years ago to build a 250-mile electric railway system, with Madison as the hub, will resume work on the construction of the line from Madison to Stoughton, Wis., at once. The general contract for the work has been let to John T. Adams, Columbus, O. J. E. Jones is president of the company.

MANITOWOC, WIS.—The Green Bay & Eastern Railway Co., organized several months ago with $50,000 capital, has increased its capital stock to $3,000,000 and will proceed with the construction of its proposed electric line from Green Bay to Sheboygan, Wis., via Manitowoc, Rudolph Stockinger is secretary.

Office Changes Are Announced

The Kirk Supply Co., Pittsburgh, has entered the Cleveland field as representative of the Sterling Wheelbarrow Co., Milwaukee, and has open an office and warehouse at 422 Frankfort avenue, Cleveland.

The firm name of the Kales-Haskel Co., Detroit, has been changed to that of the Kales Stamping Co. No changes in the personnel of the organization or the product were involved.

The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., has established an export department in New York at 30 Church street.

The Whiting Foundry & Equipment Co., Harvey, Ill., has opened a branch sales office at 411 Fulton building, Pittsburgh. F. J. Page, for many years connected with the home sales department, is in charge.

MARINETTE, WIS. — The Standard Oil Co. through its Duluth branch, contemplates the erection of new tank storage and warehouses at the district office in Marinette. Derrick & Hubert, Menominee, Mich., are preparing plans.

McFARLAND, WIS.—D. R. Butler, Madison, Wis., has taken the contract for erecting a $50,000 high school for the village of McFarland. Edward Tough, Madison, is architect.

MILWAUKEE. — The Wasson Trolley & Mfg. Co. has been incorporated with $50,000 capital by Charles Pfeiffer, D. R. Moore, and Frank A. Wasson.

MILWAUKEE.—Articles of incorporation have been filed in behalf of the American Auto Body Co. The capital stock is $40,000 and the incorporators are L. L. Gridley, David J. Borun and Henry E. Bradley.

MILWAUKEE.—Architect Stanley F. Kadow, 988 Kinnickinnic avenue, is preparing plans for a foundry and machine shop, to be established in Cudahy or St. Francis. The name of the owner is withheld. The main building will be 80 x 163 feet, with a wing, 20 x 163 feet, for sand, fire clay and punching rooms. Bids will be taken about the end of August.

MILWAUKEE. — The Allis-Chalmers Mfg. Co., Milwaukee, has been awarded the contract for furnishing and equipping an auxiliary steam generating plant of 1500 kilowatt capacity for the Wisconsin Valley Electric Co. The plant will consist of a steam turbine unit, with automatic stokers and Heine boilers, and will cost approximately $90,000.

PORT WASHINGTON, WIS.—The Beeman Garden Tractor Co., Minneapolis, has closed a contract with the Gilson Mfg. Co., Pt. Washington, founder and machinist, for the manufacture of 5000 small garden tractors, driven by 1-horsepower gasoline engines. Delivery will begin in September.

PORTAGE, WIS. — The common council has awarded the general contract for the construction of a water purification plant costing $80,000 to the Cast Stone Construction Co., Eau Claire, Wis., and the equipment to the Pittsburgh Filter Mfg. Co. L. P. Wolff, St. Paul, Minn., is consulting engineer.

RACINE, WIS.—The Webster Electric Co., motor-driven appliances, is completing work on its new plant, costing $100,000 and will start manufacturing some time this month.

SHAWANO, WIS.—A new public garage and repair shop estimated to cost $20,000 will be erected by the Schweers Hardware Co. It will be 50 x 150 feet in size and two stories high.

SHEBOYGAN, WIS.—Juul & Sixta, architects, are completing plans for a $15,000 addition to the public garage and repair shop of the Sheboygan Auto & Supply Co. at 816 Niagara avenue.

SOUTH MILWAUKEE, WIS.—The Stowell Co., founder and machinist, has awarded contracts for the erection of a large warehouse and shipping room building, designed by Leenhouts & Guthrie, architect, Milwaukee.

STOUGHTON, WIS. — The Moline Plow Co., owning and operating the Mandt Wagon Works, Stoughton, will build a 40-compartment dry kiln, 120 x 276 feet, and a new dry shed, 70 x 70 feet.

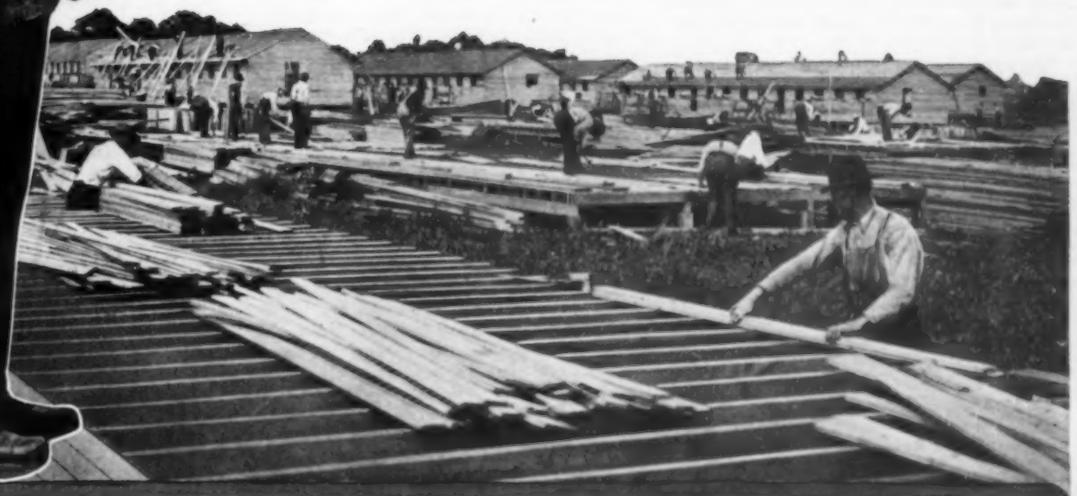
WAUPACA, WIS.—The Jersild Fire Escape Co., formerly of Neenah, Wis., which established a plant in Waupaca late in 1916, is disposing of additional stock to make it possible to enlarge its plant to fill orders. The company has a capital stock of $100,000, and about $25,000 is outstanding.

WAUSAU, WIS.—The Wisconsin Soap Co. is building a potash manufacturing plant, 40 x 126 feet.

WHITEFISH BAY, WIS. — The village board has awarded the contract for furnishing and laying 20,900 feet of 6-inch, and 2290 feet of 8-inch cast iron water pipe, gates, curves, sleeves and plugs, to John M. Donahue, Stevens Point, Wis., at approximately $65,000.

WHITEWATER, WIS.—A public garage

One Complete Barracks every 63 Minutes.



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and repair shop, 65 x 125 feet, to cost $12,500, will be erected by the Mason & Kraeplin Motor Co.

DEARBORN, MICH.—Henry Ford & Son, Inc., capitalized at $1,000,000, has been chartered to manufacture tractors, by Henry Ford, C. J. Ford and Edsel Ford.

DETROIT.—The General Motors Co. will build a forge shop requiring nine 10 to 15-ton electric traveling cranes and other shop equipment.

DETROIT. — The Superheated Carburetor Co., capitalized at $50,000, has been chartered to manufacture carburetors, motors, tractors, airplanes and other mechanical devices. The incorporators are: Stanley R. DuBrie, F. L. Sutherland, William H. Turner.

GLADSTONE, MICH.—The Marble Arms & Mfg. Co. is contemplating an addition to its plant, two stories, 60 x 140 feet.

JACKSON, MICH.—The American Fork & Hoe Co. is building a 3-story factory costing $24,000.

KALAMAZOO, MICH.—The Victor Wire Wheel Co., capitalized at $500,000, has been chartered to manufacture wire wheels and parts for automobiles and aircraft by Dwight Seymour, John F. O'Connell and Harry den Bleyker.

MANISTEE, MICH.—The Manistee Iron Works will build an addition.

CHICAGO.—The Root & Vandervort Corp., capitalized at $4,000,000, recently was chartered in Delaware by Harry H. Phillips, W. R. Watson and B. J. Cramer.

CHICAGO.—The Axleford Truck Co. has been incorporated with $2500 capital by Adam Sommers, C. H. Vehstedt, and H. B. Vehstedt, 927 Crescent place.

CHICAGO.—The Lee Gas Generator Co. has been incorporated with $50,000 capital by N. M. Morris, J. P. Carroll, and Dwight Bobb, 76 West Monroe street.

CHICAGO.—The Calumet Machine & Casting Co. has been incorporated in Delaware with $250,000 capital to manufacture machinery and foundry products, by Harry Lewis and Samuel C. Rowland.

CHICAGO.—The Chicago, Milwaukee & St. Paul railroad has construction under way in electrifying 211 miles of its line over the Cascade Mountains, from Othello, Wash., to Seattle.

CHICAGO.—The National Carbon Co. has bought a site at the intersection of South Ashland avenue and Thirty-seventh street, including a manufacturing building 135 x 500 feet.

CHICAGO. — The Joslyn Manufacturers Supply Co. has bought from the Central Mfg. District, Inc., a site 190 x 377 feet at the intersection of Morgan and West Thirty-eighth streets.

CHICAGO.—Gallanis Bros. have had plans prepared for a 6-story building to cost about $200,000 at Halsted street and Nineteenth place. The contract has been let to the Levine Construction Co.

FORT WAYNE, IND.—The Fort Wayne & Northern Indiana Traction Co. has secured a permit to erect an $85,000 power house.

CLEVELAND.—The Hex Nut Co. recently was chartered with $10,000 capital by Ernest Hollings, G. O. Farquharson and others.

CLEVELAND. — The General Alloys Co., capitalized at $150,000, has been chartered by H. A. Hauxhurst, M. L. Flanagan and others.

CLEVELAND.—An application for a permit has been filed by the City Machine Co. for a 1-story factory building to cost about $18,000.

CLEVELAND. — The Osborn Engineering Co. has drawn plans for a sand storage plant for the Standard Steel Castings Co., to be 1-story high and cost about $12,000.

CLEVELAND.—The St. Clair Refining Co. has made application for a permit to erect a garage, boiler and warehouse to be 57 x 230 feet and to cost $25,000.

CLEVELAND. — The Pioneer Machine & Engineering Co. has been chartered with $20,000 capital by A. A. Winkel, A. Humbel, W. B. Boon, F. G. Novy and William T. Hennig.

CLEVELAND.—The Forsyth Chemical Co. has been incorporated with $50,000 capital by Emmett P. Dowling, John L. Dowling, Richard J. Moriarty, Carl D. Ainger and Paul B. Condt.

CLEVELAND. — Architects, Christian Schwarzenberg and Gaede soon will take bids for a 66 x 104-foot factory building for the Grabler Mfg. Co., to be built at an estimated cost of $75,000.

CLEVELAND.—H. T. Jeffery, 408 Union building, is preparing plans for a 12-story, $500,000 commercial hotel, to be 67 x 145 feet in size. G. A. Tenbusch of the Tenbusch Realty Co. is interested.

CLEVELAND.—Goakes & Dettelbach, real estate brokers, have taken an option on a 600-acre tract at Little Mountain for Cleveland clients who contemplate the construction of an airplane factory.

CLEVELAND. — The Masters & Mullen Construction Co., Electric building, has been awarded the general contract for a 1-story, 120 x 400-foot factory building for the White Motor Co. to cost about $300,000.

CLEVELAND. — The Pioneer Machine & Mfg. Co. recently was organized to engage in a general machine shop business. The new company is capitalized at $20,000 and was organized by A. A. Winkel, A. Humbel and others.

CLEVELAND.—The Strickland Automatic Brick Machine Co. has been incorporated with $10,000 capital to manufacture machinery by Lawrence B. Koblitz, D. J. Strickland, William B. Cohen, M. J. Koblitz and A. G. Koblitz.

CLINTON, ILL.—The Alexander Railroad Crossing Co. has bought a site at Chicago Heights and will establish a factory for the manufacture of railroad crossings and railroad specialties.

CONNEAUT, O. — The Conneaut Metal Works Co. has been incorporated with $40,000 capital by Wilfred Lumley, Herbert L. Parker, C. E. Benjamin Jr., C. A. Risely and E. T. Dorman.

DANVILLE, ILL.—The Moore Motor Vehicle Co. has been incorporated with $100,000 capital and has established a plant at Danville. George L. Moore is president.

DEFIANCE, O.—The Baltimore & Ohio railroad has purchased a 26-acre site and will erect several buildings. Plans have been made to remove the division passenger terminal from Garrett, Ind.

FINDLAY, O.—The Star Tractor Co. has been incorporated with $100,000 capital by J. E. Bicknell, C. L. Casterline, Charles E. Jordan, C. A. Schubert and F. H. Gerdeman.

KANKAKEE, ILL.—Bids will be received until Aug. 30 by commissioners of Kankakee and Will counties at the court house in Kankakee for a reinforced concrete arch bridge over Kankakee river containing seven 70-foot spans and two 68-foot spans, to cost $50,000.

LORAIN, O.—The Universal Bearing Co. recently incorporated with $10,000 capital will shortly begin the construction of a factory building.

PEORIA, ILL.—The Peoria Malleable Castings Co. has bought 16 acres and is erecting two buildings, 120 x 200 feet and 100 x 220 feet, which will be added to later. H. Hemingway, Beloit, Wis., is general manager.

TOLEDO, O.—The Lewis Steel Products Co. has been chartered with $100,000 capital by Charles S. Northrup, Oscar J. Smith and others.

LOUISVILLE, KY.—The Aetna Refining Co., New York, J. King Duffy, president, has purchased a 40-acre tract just outside the city and will establish a refinery with a capacity of 2500 to 4000 barrels daily, at a cost of $500,000.

Southeast

MEMPHIS, TENN.—Columbus Bierce is in the market for 1500 feet of 8-inch cast iron pipe with tees and ells.

MEMPHIS, TENN.—T. H. Nance, 245 East Calhoun street, is in the market for wire and small sheet-metal bending machines.

KNOXVILLE, TENN.—The John G. Duncan Co. requests dealers' prices on a 75-horsepower direct current motor for immediate delivery.

KNOXVILLE, TENN.—The W. J. Oliver Mfg. Co. contemplates the installation of additional machinery and doubling the capacity of its plant to provide facilities for manufacturing projectiles for the government.

SAVANNAH, GA.—The Cambria Steel Co., 165 Broadway, New York, plans to build a shipbuilding plant here.

PENSACOLA, FLA.—The Georgia, Florida & Alabama railroad plans to erect a shop to cost about $50,000. R. B. Coleman, Bainbridge, is the chief engineer.

Central South

HOUSTON, TEX.—The West Texas Mica Co. has been incorporated with $2,500,000 capital to mine, mill and refine ores. The incorporators are: S. Keith, D. R. McNeal and W. O. Illfley.

HEALDTON, OKLA.—The Ardmore Refining Co. will construct a 6-inch pipe line from Healdton to Ardmore. Preliminary surveys now are being made.

LAWTON, OKLA. — The Cannady Construction Co., Tulsa, has been awarded a contract for the construction of a pipe line from Lake Lawtonka to Lawton, at the contract price of $75,000.

MUSKOGEE, OKLA.—The Klanke Mfg. Co. recently was chartered with $3000 capital to engage in the manufacture of adjustable socket wrenches by E. E. Klanke, Andrew Waterson and Edward Hirsch.

WAURIKA, OKLA. — The Beaver Valley Oil & Refining Co., Frank Bauman, secretary and treasurer, is in the market for refinery equipment and construction material.

Pacific Seaboard

AMERICAN LAKE, WASH. — The Lang Mfg. Co., Seattle, has been awarded the contract to manufacture 460 ranges for the American Lake cantonment at a cost of $80,000.

OLYMPIA, WASH.—Major E. J. Dent, United States engineer corps, has approved the project of the city to erect a steel and concrete bridge at Fourth street to cost $150,000. Bids will be requested by the city clerk as soon as final authority is received from Washington.

SEATTLE.—The Marine Pipe & Machine Works, 579 Railroad avenue, will build a 2-story foundry and machine shop costing $15,000.

SPOKANE.—Aaron Kuhn, Martin Woldson and others have purchased an interest in the

Mohawk Mining Co., Willow Creek, Alaska, and will install a mill of about 40 tons capacity daily, to cost about $15,000.

TACOMA, WASH.—A contract has been let to the Crane Co. for 84,465 feet of galvanized iron pipe for the American Lake cantonment.

BERKELEY, CAL. — The Philadelphia Quartz Co. plans to build a plant to cost about $10,000. A. C. Elkington is president of the company.

SAN FRANCISCO.—The A. J. Savage Munitions Co., San Diego, plans to erect a factory. The first unit will cost about $150,000.

Canada

CHATHAM, ONT.—Sarvice, Inc., has been incorporated to carry on a general mining, smelting and refining business with $48,000 capital, by Charles J. Sarjeant, William S. Radford, Archibald McAlpine, of Glencoe, Ont., and others.

HAMILTON, ONT. — The American Can Co. will build an addition to its plant and install new equipment at a cost of $125,000.

OSHAWA, ONT.—The Pedlar People, Inc., is in the market for a 6-foot power shear, with capacity to cut 16-gage sheets.

OWEN SOUND, ONT.—The Empire Stove & Furnace Co. has been incorporated to manufacture stoves, furnaces, radiator and castings with $100,000 capital by Archibald A. Parks; Abraham J. Creighton, Edgar W. McQuay and others.

PORT HOPE, ONT.—The Nicholson File Co. has awarded the contract for the erection of a $40,000 addition to its plant to Wells & Gray, Confederation Life Building, Toronto.

SARNIA, ONT.—The Mueller Mfg. Co. is having plans prepared by James, Loudon & Hertzberg, Toronto, for the erection of a brass foundry at Sarnia to cost $100,000.

TORONTO, ONT.—The Canadian General Electric Co. will erect a warehouse on King street at a cost of about $100,000.

TORONTO, ONT. — The Richmond Mfg. Co. has been chartered to manufacture munitions and machinery with a capital of $200,000 by Wilbert W. McKnight, Noubar Courian and E. B. McKnight.

TORONTO, ONT.—The Toronto Dry Dock Co. has been incorporated to construct and operate dry docks and vessels with $100,000 capital. John E. Russell, Harry Cresswell and Samuel W. McKeown are the directors.

TORONTO, ONT. — The Toronto Shipbuilding Co. has been incorporated to build ships with $100,000 capital by John E. Russell, John J. Manley and Samuel W. McKeown, are the incorporators.

TORONTO, ONT.—The British American Shipbuilding Co. has been incorporated with $1,000,000 to engage in a business as shipbuilder. The incorporators are: Francis H. Keeler, A. L. Martin and Andrew A. Kinghorn.

TORONTO, ONT.—The Burns Cement-Gun Construction Co. has been incorporated with $40,000 capital to engage in a business as general builder and contractor. The incorporators are: George C. Loveys, William M. Smith and Charles L. Valens.

MONTREAL, QUE. — The William Lyall Shipbuilding Co. has been incorporated to build ships, vessels and boats and all appliance and machinery with $1,000,000 capital by Errol Languedoc, Ralph E. Allan, William Taylor and others.

MONTREAL, QUE.—The Sydney E. Junkins Co. has been incorporated to construct railways, bridges, aqueducts, wharves, buildings, with $400,000 capital by Sydney E. Jenkins, Humphry R. Drummond, Hay and Alexander J. Milligan of Winnipeg.

SHERBROOKE, QUE. — The Mackinnon Steel Co. has been incorporated, to carry on the business of engineer, general manufacturer and contractor with $500,000 capital by George D. Mackinnon, Alexander Mackinnon, and Jacob Nicol.

New Catalogs

OXY - ACETYLENE WELDING AND CUTTING APPARATUS.—An 8-page bulletin published by the Prest-O-Lite Co., Inc., Indianapolis, illustrates and describes the complete line of apparatus manufactured by this company for oxy-acetylene welding and cutting. Not only is the equipment shown, but all of the accessories required for this work are illustrated and described.

AIR DRILLS.—The Independent Pneumatic Tool Co., Chicago, recently published a folder devoted to piston air drills and pneumatic riveting hammers. The booklet illustrates all sizes of hammers and drills manufactured by the company and gives complete specifications such as amount of air used, weight, length, blows struck per minute, piston diameter, etc. Electric drills are also considered in the folder.

CRANES.—A catalog issued by the Whiting Foundry Equipment Co., Harvey, Ill., illustrates and describes a line of cranes, together with miscellaneous foundry equipment. Locomotive, cranes, gantry cranes, pillar cranes and special cranes are illustrated. Electric traveling cranes are made in three, four, five and six-motor types, with capacities varying from 3 to 150 tons. These cranes are built with automatic solenoids and mechanical brakes, gears completely encased, and a positive limit switch which is claimed to prevent over-hoisting the block and which at the same time permits a lowering of the block without necessitating the operator's leaving the cage.

OIL BURNERS.—A 16-page booklet describing and illustrating oil burners and oil burning systems was recently issued by the Hammel Oil Burning Equipment Co., Providence, R. I. It is claimed that these burners will handle both heavy and light oil in either hot or cold condition. The Hammel furnace is also said to contain no checker work, bridge walls or flash walls of any kind. Oil pumps for these systems are fitted with either one or two duplex steam pumps. The oil heater is of cast iron fitted with flanged head and outlets. The drip pans are likewise of cast iron. Specification tables are presented in the booklet, also a table showing the results of tests on a Babcock & Wilcox boiler equipped with Hammel oil burning equipment. A partial list of users of Hammel products is also presented in the latter portion of the booklet.

FOUNDRY EQUIPMENT AND SUPPLIES.—One of the most comprehensive catalogs yet published, devoted exclusively to foundry and platers' equipment, supplies and accessories, has been issued by the E. J. Woodison Co., Detroit. It contains 560 pages in addition to a well arranged 16-page index. This catalog will prove a valuable addition to the trade library of every foundry and plating plant. The introductory pages are unique, as they contain the individual portraits of the entire Woodison organization. The catalog is well arranged, beginning with sand, and is followed by facings, core compounds, core binders, parting compounds, fluxes, alloys, etc. Succeeding pages are devoted to small foundry supplies, such as brushes, riddles, rammers, bellows, shovels, forks, sprayers, chaplets, mallets and other small supplies required by every foundry. A number of pages are devoted to flasks, steel bottom plates, clamps and follow boards, and this is succeeded by equipment for the sand-blast room. Several pages are devoted to ladles, cupolas, blowers, etc., and one section is devoted to equipment for the core room. Hoists of various types are illustrated, as well as machinery for the pattern shop. The cleaning room is not overlooked and includes such equipment as sand-blasts and tumbling mills, as well as air compressors for furnishing air for the various foundry departments. Molding machines, fire brick and cupola blocks are featured. This work also contains a complete catalog of platers' supplies and equipment, 154 pages being devoted to this section. In addition, the catalog contains many valuable tables, hints and suggestions for gray and malleable iron, steel and brass foundrymen, as well as for polishers and platers.

ELECTRIC HOISTS. — Electric hoists, built in capacities varying from ½ of a ton to six tons, and in two general types, worm and spur geared, are described in a 32-page bulletin recently issued by the Sprague Electric Works, New York. These hoists are said to have large gear ratios with few gear reductions, thus saving space and headroom. The angles of the worms are also claimed to be such that the loads cannot overhaul the gears, in this manner eliminating mechanical friction and load brakes. In the first seven pages of the bulletin specifications for all hoist parts are presented. In the succeeding 18 pages several different styles of hoists are illustrated with diagrammatic views. This section also includes tables of dimensions, and electric currents necessary for operation. The latter portion of the booklet is devoted to reproductions of photographs showing Sprague hoists in actual practice.

MONORAIL HOISTS.—A 32-page bulletin, issued by the Sprague Electric Works of the General Electric Co., New York City, is devoted to the extensive line of cage controlled monorail hoists built by this company. These hoists operate on I-beam tracks, travel at a high rate of speed and can go anywhere that the single I-beam runway can be supported. These hoists are equipped with swivel trucks, enabling them to run around sharp curves so that with a properly designed runway system, with switches, turntables, etc., the hoists are able to pass one another and to convey their respective loads to their destinations without the delay caused by the traveling crane which usually occupies its entire runway. The bulletin is unusually well-illustrated with service views of these hoists in operation in various industrial plants. Monorails in casting plants are shown conveying hot metal, handling molding sand, handling a grab bucket, etc.

GEAR HOBBER.—Eight and 24-inch gear hobbers are described in a two-page folder issued by the Himoff Machine Co., New York. The general design of the newly developed tools includes the use of box sections throughout. The hob arbor is carried on the vertical column and all shocks on the cutter are thereby transmitted to the base of the machine. The work may be either clamped evenly and rigidly to the work table or it may be held in a vertical mandrel parallel to the table. The machine is so designed that the chips fall away from the cut. Automatic stops are provided which disconnect the cutting feed, thus allowing one man to operate several machines simultaneously. A geared oil pump provides for the necessary lubrication when the machine is working on steel. The regular equipment supplied with these tools includes hob and work arbors, set of change gears cutting up to 360 teeth, and a set of feed-change gears.

Iron and Steel Prices

Corrected to Tuesday noon

IRON ORE

Superior Ores, Per Ton, Lower Lake Ports.	
Old range Bessemer, 55 iron	5.95
Mesabi Bessemer, 55 iron	5.70
Old range non-Bess., 51½ iron	5.20
Mesabi non-Bess., 51½ iron	5.05
Port Henry Ores, non-Bessemer, Per Unit, Delivered Eastern Pennsylvania.	
Old Bed, crude 55 iron	10.50c to 11.00c
Old Bed., concent., 65 iron	11.00c to 11.50c
Harmony, concent., 63 iron	11.50c to 11.75c
Lump (at mines)	$5.75

WAREHOUSE PRICES

Steel bars, Chicago	4.50c
Steel bars, Cleveland	**5.00c**
Steel bars, Detroit	4.50c
Steel bars, Philadelphia	5.00c to 5.50c
Steel bars, New York	4.75c to 5.00c
Steel bars, St. Louis	4.55c
Steel bars, Cincinnati	**5.00c**
Steel bars, St. Paul	4.60c
Steel bars, Buffalo	4.60c to 5.10c
Iron bars, Chicago	4.50c
Iron bars, Cleveland	**4.95c**
Iron bars, Detroit	4.50c
Iron bars, St. Louis	4.45c
Iron bars, Cincinnati	**5.00c**
Iron bars, Philadelphia	5.00c
Iron bars, New York	5.00c
Shapes, Chicago	5.00c
Shapes, Detroit	5.00c
Shapes, St. Louis	5.05c
Shapes, St. Paul	5.10c
Shapes, New York	5.00c to 5.25c
Shapes, Cleveland	**5.25c**
Shapes, Philadelphia	5.00c to 5.50c
Shapes, Buffalo	5.10c to 5.35c
Shapes, Cincinnati	**5.25c**
Plates, Chicago	7.00c to 10.00c
Plates, Detroit	**9.00c to 10.00c**
Plates, St. Louis	7.05c to 7.55c
Plates, St. Paul	**7.10c**
Plates, New York	8.00c to 9.00c
Plates, Cleveland	7.50c
Plates, Philadelphia	9.50c to 10.00c
Plates, Cincinnati	10.00c
No. 10 blue anl. sheets, Chi.	9.50c to 10.00c
No. 10 blue anl. sheets, Cleve.	9.50c
No. 10 blue anl., Buffalo	11.00c to 11.75c
No. 10 blue anl., sheets, St. L.	10.05c
No. 10 blue anl. sheets, Cinci.	10.00c
No. 10 blue anl. sheets, St. Paul	9.60c
No. 28 black sheets, Chgo	9.50c to 10.00c
No. 28 black sheets, Chicago	9.50c
No. 28 black sheets, Cleve.	9.50c
No. 28 black sheets, Cincin.	8.65c
No. 28 black, Detroit	**9.50c**
No. 28 black sheets, St. L.	10.35c
No. 28 black sheets, St. Paul	9.60c
No. 28 galv. sheets, Chgo.	11.00c to 11.50c
No. 28 galv. sheets, Cleve.	11.00c
No. 28 galv. sheets, Cincin.	10.65c
No. 28 galvanized, Detroit	**11.00c**
No. 28 galv. sheets, St. L.	11.75c
Hoops, Cleveland	6.00c
Hoops, Detroit	**7.00c**

IRON AND STEEL SCRAP

STEEL WORKS USE
(Gross Tons)

Bundled sheets, Pittsburgh	$25.00 to 27.00
Bundled sheets, Cleveland	26.50 to 27.50
Bundled sheets, Buffalo	20.00 to 21.00
City wrought, short, N. Y.	27.00 to 28.00
Frogs, switches, guards, St. L.	29.50 to 30.00
Heavy melting steel, Pitts	33.00 to 35.00
Heavy melting steel, Buffalo	31.00 to 33.00
Heavy melting steel, Chgo.	32.50 to 33.00
Heavy melt'g steel, Cleveland	30.00 to 32.00
Heavy melting steel, Cinci.	31.00 to 31.50
Heavy melting steel, east. Pa.	31.00 to 32.00
Heavy melting steel, N. Y.	27.00 to 28.00
Heavy melting steel, St. L.	30.00 to 30.50
Heavy melt'g steel, Birming.	19.00 to 20.00
Hydraulic pressed sh'ts, Cleve.	27.50 to 28.50
Hydraulic press. sheets, Pitts.	31.00 to 32.00
Hydraulic pressed sh'ts, Chgo.	25.00 to 25.50
Low phos. steel, Buffalo	45.00 to 48.00
Low phos. steel, Pittsburgh	45.00
Low phos. steel, eastern Pa.	56.00 to 58.00
Shoveling steel, Chicago	30.00 to 31.00
Shoveling steel, St. Louis	27.00 to 27.50
Steel rails, short, Chicago	40.00 to 41.00
Steel rails, short, Cleveland	37.50 to 38.50
Steel rails, short, St. Louis	39.00 to 40.00
Steel rails, old, Birmingham	25.00 to 26.00
Stove plate, Cincinnati	17.00 to 17.50
Stove plate, St. Louis	16.50 to 17.00
Stove plate, N. J. points	21.00 to 21.50
Stove plate, Birmingham	16.00 to 17.00
Stove plate, Buffalo	21.00 to 22.00
Stove plate, eastern Pa.	21.00 to 22.00
Stove plate, Pittsburgh	23.00 to 23.50

(Net Tons)

Boiler plate, cut, No. 1, Chgo.	$20.00 to 21.00
Boiler plate, cut, No. 1, St. L.	19.00 to 19.50
Bundled sheets, Cincinnati	19.00 to 19.50
Knuckles, coup., Chicago	41.00 to 42.00
Knuckles, coup., St. Louis	39.00 to 40.00
Springs, Chicago	42.00 to 43.00
Stove plate, Chicago	19.00 to 20.00
Stove plate, Cleveland	20.50 to 21.50

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:	
Cleveland	$0.95
Newark, N. J.	2.98
Boston	3.18
Philadelphia	2.78
Pittsburgh	.95
St. Louis	3.18
Minneapolis, St. Paul	4.54
Buffalo to:	
Albany, N. Y.	$1.26
New England (rail)	2.58
New York and Brooklyn (rail)	2.58
Virginia furnaces to:	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
Minneapolis, St. Paul	5.85
New York (r. and w.)	4.25
Philadelphia (r. and w.)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
St. Louis	3.40
Chicago to:	
Des Moines	$2.80
Milwaukee	.50
Minneapolis, St. Paul	2.00
Moline, Ill.	1.40
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58
Minneapolis, St. Paul	4.54
Duluth, Minn., to:	
Minneapolis-St. Paul	$1.25
Mayville, Wis.:	
Minneapolis-St. Paul	$1.75

Freight Rates, Finished Material

Pittsburgh, carloads, per 100 lbs., to:	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Detroit	15.7 cents
Minneapolis and St. Paul	32.9 cents
Denver	76.1 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast (all rail)	73.9 cents
Pacific coast (tin plate)	70 cents
Pacific coast, via Panama	61.0 cents

IRON MILL USE
(Gross Tons)

Busheling, No. 1, Buffalo	28.00 to 29.00
Busheling, No. 2, Buffalo	18.00 to 19.00
Busheling, No. 1, Pittsburgh	25.00 to 27.00
Cast borings, New York	18.00 to 18.50
Cast borings, eastern Pa.	21.00 to 22.00
Cast borings, Buffalo	20.00 to 21.00
Cast borings, Pittsburgh	21.00 to 22.00
City wrought, long, New York	36.00
Forge flashings, small, Cleve.	29.00 to 29.50
Forge flashings, large, Cleve.	26.50 to 27.50
Forge, No. 1, eastern Pa.	21.50 to 22.50
Grate bars, Buffalo	20.00 to 21.00
Grate bars, N. J. points	19.00 to 19.50
Iron axles, Pittsburgh	50.00 to 52.00
Iron axles, Cincinnati	44.00 to 44.50
Iron axles, eastern Pa.	50.00 to 55.00
Iron axles, Buffalo	45.00 to 50.00
Iron rails, Chicago	40.50 to 41.50
Iron rails, Buffalo	43.00 to 44.00
Iron rails, Cincinnati	34.50 to 35.00
Iron rails, St. Louis	39.00 to 40.00
Iron rails, Cleveland	42.00 to 43.00
Machine turnings, Chgo.	17.00 to 18.00
Machine turnings, Buffalo	$18.00 to 19.00
Machine shop turnings, N. Y.	18.00 to 18.50
Mach. shop turnings, Pitts.	20.00 to 21.00
Mch. shop turnings, east. Pa.	19.00
Machine turnings, Birming.	11.00 to 12.00
R. R. mch. cast, No. 1, Buff.	30.00 to 31.00
R. R. wrought, 1, Buffalo	43.00 to 45.00
R. R. wrgt., No. 1, east. Pa.	43.00 to 47.00
R. R. wrought, No. 1, Pitts.	43.00 to 44.00
R. R. wrought, 1, B'ham	28.00 to 29.00
Wrought pipe, Buffalo	29.00 to 30.00
Wrought pipe, eastern Pa.	30.00 to 32.00
Wrought pipe, New York	27.00 to 28.00

(Net Tons)

Angle bars, iron, Chicago	$38.00 to 38.50
Angle bars, steel, St. Louis	28.50 to 29.00
Arch bars & transoms, St. L.	40.00 to 41.00
Arch bars & transoms, Chgo.	38.75 to 39.25
Busheling, No. 1, Chicago	25.00 to 26.00
Busheling, No. 1, Cincinnati	21.50 to 22.00
Busheling, No. 1, Cleveland	24.50 to 25.50
Busheling, No. 1, St. Louis	24.00 to 24.50
Busheling, No. 2, Chicago	20.00 to 20.50
Cast borings, Cincinnati	13.50 to 14.00
Cast borings, Cleveland	17.50 to 18.50
Cast borings, St. Louis	14.00 to 14.50
Cast borings, Chicago	**17.00 to 18.00**
Cut forge, Chicago	32.00 to 33.00
Grate bars, Cleveland	21.00 to 22.00
Iron axles, St. Louis	44.00 to 45.00
Iron axles, Chicago	**47.00 to 48.00**
Iron axles, Cleveland	46.00 to 46.50
Machine shop turnings, Chgo.	17.00 to 18.00
Mach. shop turnings, Cleve.	16.00 to 16.50
Machine shop turn'gs, Cinci.	13.50 to 14.00
Mach. shop turnings, St. L.	14.50 to 15.00
Pipes and flues, Cleveland	23.50 to 24.00
Pipes and flues, Chicago	23.00 to 24.00
Pipes and flues, St. Louis	19.50 to 20.00
Railroad wrought, 1, Cleve.	40.50 to 41.50
Railroad wrgt., No. 1, Chgo.	36.00 to 37.00
Railroad wrought, 1, Cinci.	34.50 to 35.00
Railroad wrought, 1, St. L.	33.00 to 33.50
Railroad wrgt., No. 2, Chgo.	33.00 to 34.00
Railroad wrought, 2, St. L.	31.00 to 31.50

IRON OR STEEL WORKS USE
(Gross Tons)

Axle turnings, Cleveland	$26.50 to 27.00
Axle turnings, Buffalo	26.00 to 27.00
Shafting, New York	41.00
Shafting, eastern Pa.	45.00 to 47.00
Steel car axles, Birmingham	32.00 to 33.00
Steel car axles, New York	54.00
Steel car axles, Buffalo	45.00 to 50.00
Steel car axles, Cleveland	50.00 to 51.00
Steel car axles, Pittsburgh	50.00 to 52.00
Steel car axles, eastern Pa.	50.00 to 55.00

(Net Tons)

Shafting, St. Louis	39.00 to 40.00
Steel car axles, St. Louis	44.00 to 45.00
Steel car axles, Chicago	44.00 to 45.00

IRON FOUNDRY USE
(Gross Tons)

Car wheels, (iron), Pitts.	$33.00 to 34.00
Car wheels, (steel), Pitts.	40.00 to 41.00
Car wheels, Chicago	30.00 to 32.00
Car wheels, eastern Pa.	36.00 to 38.00
Car wheels, Buffalo	35.00 to 36.00
Car wheels, New York	35.00
Car wheels, St. Louis	31.00 to 31.50
Car wheels, Birmingham	23.00 to 24.00
Car wheels, Cleveland	30.50 to 31.50
Tram car wheels, Birming.	20.00 to 21.00
Cast, No. 1, Birmingham	22.00 to 23.00
Cast, 1, machy., N. J. points	38.00
Cast, 1, heavy, N. J. points	34.00 to 35.00
Cast, No. 1, eastern Pa.	33.00 to 34.00
Cast, No. 1, Pittsburgh	33.00 to 34.00
Malleable railroad, Cincinnati	26.00 to 26.50
Malleable railroad, Cleveland	30.50 to 31.50
Malleable railroad, Buffalo	33.00 to 34.00
Malleable railroad, Pittsburgh	31.00 to 33.00
Malleable railroad, east. Pa.	32.00 to 34.00

(Net Tons)

Cast No. 1, Cleveland	29.50 to 30.50
Cast, No. 1, Chicago	26.00 to 27.00
Cast, No. 1, Cincinnati	24.50 to 25.00
Cast, No. 1, St. Louis	23.00 to 23.50
Malleable railroad, Chicago	31.50 to 32.50
Malleable railroad, St. Louis	27.00 to 27.50
Malleable agricultural, Chgo.	25.50 to 26.50

MISCELLANEOUS USES
(Gross Tons)

Reroll. rails, 5 ft. & ov., Pitts.	$45.00
Reroll. rails, 5 ft. & ov., Chgo.	39.50 to 40.00
Reroll. rails, 5 ft. & ov., E. Pa.	43.00 to 45.00
Reroll. rails, 5 ft. & ov., St. L.	40.00 to 41.00
Reroll. rails, 5 ft. or ov., Cleve.	44.00 to 45.00
Rerolling rails, long, Birming.	37.50 to 38.50

(Net Tons)

Boiler punchings, Chicago	36.50 to 37.50
Locomotive tires, Chicago	46.00 to 47.00
Locomotive tires, St. Louis	47.00 to 48.00